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ABSTRACT

This resource book draws together articles on the development and maintenance of camp sites and facilities. The articles, previously published by "Camping Magazine" and "Journal of Christian Camping," cover (1) site planning and long-range development, including redesigning multiple camp facilities for year-round programs, remodeling and winterizing, site design, and land stewardship; (2) new building construction, including considerations for do-it-yourself projects, camp building alternatives, and how to use architects and consultants; (3) site conservation, including camp forestry and conservation, wildlife habitat improvement, and acid rain effects; (4) preventive maintenance, including the roles of the camp maintenance man, property management audits, off-season maintenance tasks, pool maintenance, proper use of pool chemicals and pH test kit, floor care, do-it-yourself docks, and a calendar checklist of maintenance tasks; and (5) energy, including energy savings through effective maintenance, solar energy and heat, building a solar heater, energy alternatives and savings, and buying emergency power. The book contains an index and sample forms: equipment and supply inventory, maintenance checklists, comparative shopping form, work order request and request log, emergency telephone checklist, and mechanical equipment record. (SV)

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SITE AND FACILITIES

A Resource Book for Camps

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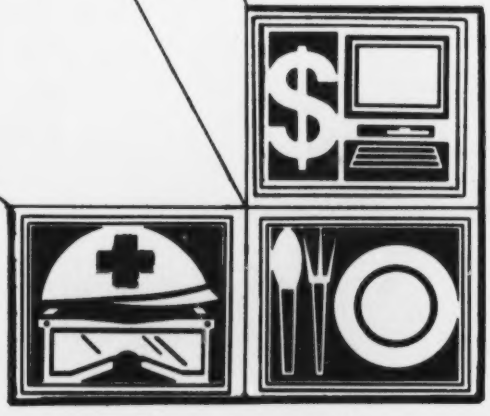

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Camp Administration Series

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Site and Facilities

A Resource Book for Camps

Armand and Beverly Ball, Editors

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Introduction

Four areas of camp management particularly involve areas of expertise for which the camp often employs a specialist to supervise: business, site development and maintenance, health, food service. Yet every camp director/administrator needs to have a broad understanding of each of these areas of camp management.

Much of the writing in these fields is directed to the specialist and deals with technical matters of primary interest to that specialist. In an effort to provide a resource book of a more general nature, we have drawn together articles in these four areas previously published by *Camping Magazine* and *Journal of Christian Camping* for publication in this form. We believe that the information contained in these articles is still timely and will assist today's camp administrator in the knowledge needed in these four broad areas of camp management. It should be noted that the quantity of articles on a given topic does not necessarily indicate the importance of that topic but rather what has been published in recent years.

ACA's Camp Director Education program includes Managerials in these four subject areas and one-day sessions are offered by many ACA Sections across the country on a regular basis. As a convenience, this resource book is organized around the topics outlined in those managerial course outlines.

We hope that this publication will be useful to camp administrators and stimulate persons to do further writing in these subject areas.

I. Site Planning and Long-Range Development

Planning and Development Series

I. by Art Harrison
II. Maurice D. Bone
III. by Paul S. Fjare
IV. by Charles Stott
V. by Paul S. Fjare
VI. by Charles Stott

Planning and Development I.

CAMPING MAGAZINE, JANUARY 1977

This bit of information is aimed at that vast audience of creative humans who somewhere, at sometime in their lives, have determined that camping in at least one of its multi-faceted forms is going to come into focus for some serious attention in their future. It is addressed to leaders and would-be leaders where the nature of their task may vary greatly but who realize certain problems in common.

Generally, they must work through organizations and groups who influence much of what their personal futures will be. At this point, it is quite important to know how to make decisions today that will improve their corporate and personal position tomorrow.

Making such decisions is what planning is all about.

Some people, when they think about organizing long range decisions, often think about inviting someone who might be identified as a professional planner - a term very often used to describe a specialized group of people - to assist them with their organizing process. Sometimes they forget that planning, as it is most often conceived, is not at all specialized, but, is the result of any decision making process, simple or complex, when such decisions have implications of change in lives and patterns of anyone affected by the change.

Planning is a dynamic tool. It is a means to evolution or revolution. Without its presence, even the simplest of tasks cannot be carried out gracefully. Most growth processes are spawned by it.

Does everyone or anyone, need it - and if so, why isn't it more successful - particularly as we look at camps who've been struggling through from infancy to senility over the years, attempting to make it work for them. Most camps and camp leaders have invested heavily in planning over the years - with and without the aid of the professional consultant - some swear by either method, others swear at them.

It is evident and logical that every project does not need a professional planner or specialized outside resource. Some projects can be well handled by the local expert; this is particularly true of those short term problems that arise around the unique personality traits of everything from land to people to equipment, etc. Sometimes a phone call or simple letter will produce a solution that's just next to perfect.

However, on the other hand, there are times when it's very important to the problem solving and decision making process to invite an experienced outsider into your closet of problems. He can sort out the material that ought to remain and that which should be disposed of, and he can create an inventory of new ideas, processes and things so you can continue to carry out all the life-giving functions that you or your organization were created to do. So, the decision to hire a planner is a critical one at any point in your life.

In making the decision to involve an outside resource in your problem, you should seriously consider the following questions:

1. Does it really require an objective viewpoint or can local experience get the job done?

2. Can you afford the time to re-interpret the problem to an outsider for consideration?

3. Can you afford the service fee?

4. Is there someone reasonable available on the outside with this kind of expertise?

5. Where can you contact that person? Who can help you do this?

6. Will it be possible for the consultant's most diametrically opposed solution, no matter how practical and workable, to be actually implemented under the present power structure?

7. Can you gracefully expose your past and interpret with clarity and honesty your present activities and your future desires?

8. Are you willing to provide the basic data and the time necessary, willingly, to work integrally with an outside resource?

9. Is the problem a real one or imagined? Is it a physical one or does it have political or emotional undertones that you are not courageous enough to work through without the planner in the role of a judge and/or referee?

10. Will you invest enough of yourself in the planning process to feel some responsibility for moving the plans ahead after the initial problem has had a reasonable solution advanced?

11. Are you planning just for planning sake as a lever against criticism or to take advantage of special incentives offered for a finished plan?

12. Could you, if all your involvement at the moment was not a fact, start the same project anew and defend the validity of your desired creation to a questioning public?

The questions go on and on. But the 12 cited will create enough mental exercise in most thinking individuals to begin to test the validity of involving someone from the outside to join you momentarily in your dilemma and forever in

your success or failure.

Planning cannot do everything. It has little relevance to solving problems of a political or emotional nature or for individuals or organizations seeking only to extend or project their present performance into the future.

In its best form, planning with outside consultation is an expensive process. One which demands early cash money for service fees, sacrificial time to provide input and monitor the process and sometimes devastating changes in the disruption of tradition and action habits of long standing.

All this is not in any way to indicate that such a planning challenge is not worth it all. In most situations, it's not only worth it - it's survival insurance - but, only if implementation is the child of the planning process. So many plans and planners remain unfertilized and sterile, for so many reasons, not the least of which is lack of faith on the part of both the planner and the plannee.

There is a high risk in planning for change; failure, revolution, displacement all are possible. But, with that risk come the partners of exhileration and strenuous exercising of the human condition and greatest of all, a glimpse of the impossible possibilities.

Planning and Development II.

CAMPING MAGAZINE, JANUARY 1977

Everyone in camping does some planning—budgets, menus, activities, trips, recruiting, sites, facilities, publicity at least. And we build on previous experiences to keep up grading our product. Planning is vital to our very existence. And most of the time we need all the help we can get.

Planning includes review. Like the careful surgeon who reviews each procedure with each new patient though he has done it a hundred times, the committed camp director plans each new season as if it were the first. He reviews the budget in light of changing costs in the ever changing economic situation. He reviews leadership needed in light of changing needs of campers. And he sometimes reviews his very existence in light of the many problems. One director, when asked what he does best replied "survive!" The high prices being paid for land coupled with new highways, housing and industrial development are real factors facing a number of camps today.

The expectation of each camp director seeking help from a planner is that the planner will bring some objectivity and experience to the situation, some wisdom as to how other camp directors may be handling the problem.

Good planning both for a new site and for improvement of one already in use makes wise use of land and water resources. The planner studies soils best suited for trees, meadows, gardens, play areas, building locations, roads, trails and sanitation disposal. The planner helps the camp develop a land conservation plan which includes timber, grasses and crops which enhance the beauty, enjoyment and attracts wildlife to the site.

Water Key Factor

Water is one of the key factors in the development of every site. Without it even a very attractive piece of land has very limited use. The planner helps use or develop water for domestic use, recreational use and for pure esthetics.

Good planning locates the living units and activity areas within reasonable access of the central facilities: pool, dining hall, meeting places and play areas. Most buildings become very permanent fixtures on the landscape hence the necessity of careful planning.

Good planning should also provide for easy supervision for each area in use. Not that we want a camp to look like a park where everything can be seen—usually a sterile environment—but each unit has its own privacy and life.

Good planning avoids cross traffic—people and vehicles. Even though it isn't easy, it is amazing how often well meaning groups get it all backwards. The problem is usually with the dining hall so that the campers compete with the service trucks because the loading dock has been poorly placed.

Full Facility Use

Most of all, good planning provides for significant use of all the facilities and resources of the site. Bee trees, beaver dams and water falls are there to be found and enjoyed by all who come to the site. In the light of increasing year-round use of camp sites, and with so many other resources available, a camp is more than a place for a meeting which can just as well be held in town.

Good planning includes good administration and use of personnel. Current pressures on organizations which include camping as an extension of their in-town program now require good administrators more than ever. Experienced planners can help here as well as with job descriptions, qualifications, funding and financial policies.

Good planning includes commitment on the part of the parent organization to specific types of camping: resident, day, family, environmental education and more. For example, the National Board of YMCA's is now developing position papers for approval by individual Y's as essential to their commitment and support.

The real value of careful planning is a desirable place for human beings. As Hedley Dimmock helped us to see, "The program of organized camping consists of experiences indigenous to group living in the out door setting." We want boys and girls, men and women to enjoy being in the out of doors and to live there as long as they can manage.

(continued on next page)

Includes Many Aspects

Good planning includes the program, activities, types, methods which help you reach your goals and objectives. Each camp has its own reason for being. Each has a tremendous opportunity to help persons mend some of the broken relationships so prevalent in our society. As the pace of living increases so do the tensions. Counsellors and campers are coming back during the "off" season just to be alone, to think it through.

Planning and Development III.

CAMPING MAGAZINE, FEBRUARY 1977

Failing to plan means planning to fail. Speaking on the importance of careful planning, Barnard Baruch once observed, "Whatever failures I have known, whatever errors I have committed, whatever follies I have witnessed in public and private life have been because of action without thought." Successful planning requires a clear definition of goals and objectives, a commitment to move toward them and an ongoing analysis of progress to date.

The planner, trained by others' experiences as well as his own, quickly discerns the existence of a problem and interprets it to the client. As an example familiar to many parents, corrective shoes are put on infants' feet long before they walk, or even creep. More radical treatment is sometimes in order, but a trained specialist sees an incipient problem long before others who are much closer to the child.

I see a similar approach in insuring a quality camping experience. Once a problem and its resultant side effects are identified and admitted within the site and camping services offered, it becomes possible to intelligently plot a course to cope with the problem.

Too often, the random ineffectiveness of problem solving comes about because it is applied with a cosmetic touch with little or no thought about long range planning coordination and effectiveness. The inability to identify problems, to establish a solution strategy, and to set about to achieve an appropriate solution are major stumbling blocks in planning.

To assume that there is a simple solution to every problem despite its complexity would result in a ridiculous planning situation. The application of some planning principles as a criteria for selecting problems that need to be integrated within the planning process seems more appropriate. Four major areas are: 1) attitudinal, 2) physical, 3) programmatic and 4) economic.

Attitude Needs Development

Perhaps the single most difficult element in planning is to develop the attitude that planning is essential. The phrase "Don't trouble, trouble, until trouble troubles you." is often applied. Another . . . "I (or we) can't afford to plan." I say that if you wait until trouble occurs or until you can afford it, you may have imposed irreparable damage to the site, program experiences and subsequently a progression of camper returns.

The attitude, the sooner the better, is most aptly applied to planning. Once the comprehensive plan has been established, positive attitudes of continued application of plan proposals, revision as necessary, and updating every three to five years with professional help should be standard operating procedures.

The historical heritage of a camp is an important attitudinal cornerstone of a camp and any planning process, but it is not the whole structure. The attitude that it always worked before is too often a negative attitude in reaching out competitively to aspiring youth of all ages, whether seven or seventy, to come to your camp to live, share, experience, challenge and grow. (Pogo phrased it appropriately in his declaration, "We have met the enemy and he is us.")

It is essential to bridge from the historical attitude into the futuristic attitude. I have experienced many camps where there is genuine resistance to change because it is uncomfortable! Yet there is nothing so dogmatically permanent as change.

It is imperative to develop a flexible attitude toward the future as well as to maximize resultant experiences, both good and bad. Setting the tone for the next year can be accomplished by continuing evaluation of site resources, physical structures, staff and even campers. Involved people may get bogged down in a quagmire of details versus philosophical attitude.

Perceive Physical Conditions

Perception of existing physical conditions is required in planning, rather than a perception of "what it was" or "what you think it is." An often repeated obervation in planning processes is that people lack a wide-angle perception of existing physical and environmental resources, as well as of program opportunities.

I have experienced innumerable sites where only 5 percent to 25 percent of a total site acreage available is currently utilized. The problem is that the program is not site expansive resulting in destruction of key areas. Site flexibility and rotation of program spaces are solutions seen in perspective by a professional planner.

As conditions are perceived objectively, it becomes necessary both to accept that perception and to strive to understand it. Management, maintenance and utilization of physical resources do not always equal stewardship of those resources. Take, for instance, the camp that added laundry facilities as a convenience to staff and campers. A chain reaction resulted in a malfunctioning sewage system that also contaminated a well. The structure housing the laundry facilities was ill conceived and had resultant structural problems (no construction permit acquired initially). Furthermore, placement

of the structure disrupted a prime in-camp program space!

Following perception and development of an understanding of the physical problem, a definite course of action is generally required. Your planner will guide you in some or all of these essential procedures:

a. Establishing a timetable to accommodate phasing requirements, completion of procedural steps and analysis of operational results.
b. Avoiding repetitive errors or omissions that simply must be reworked in the future, complicating long-range development. Lack of an orderly process may be worse than no process at all, and is generally more costly.
c. Determining what governmental rules and regulations are applicable very early in the planning process. Zoning codes, easements, land use regulations, building codes and health standards need to be considered in the definition of problems as they may affect the planning process.

Program, Continuing Opportunity

Accurate perception of program opportunities, program formulation, staffing, delivery and objective analysis of results is a continuing opportunity. In practice, however, results may fall short of anticipation. Inability to deliver experiential growth in program, a progression of camping skills, parent-camper follow-up, salesmanship and staffing development are but a few of the ingredients lacking in some camps.

"I've done it that way for 15 years and it always worked before!" Have you heard that comment lately? And what about declining enrollments? few returning campers? high staff turnovers? Are these problems at your camp? Declining birthrates, economy, competition cannot be blamed for all of the problems, which brings us back to perception of program opportunities.

If a programmatic problem does exist, it has undoubtedly been "man created" and is, therefore, "man solvable." The timetable for establishing a solution may be either immediate or long range. The solution, in any event, must be both timely and orderly, based on a pre-planned schedule.

Programming opportunities should not be overlooked because of site size, whether large or small. The alert camp director may consider other public park and recreation resources that may be near. What about that creek, river, or lake "over the fence"?

What about the changing role of women now and in the future? What about the vast people-resource upon whom early retirement has been imposed? What about inter-camp cooperation to exploit or maximize individual program strengths of each camp? What is the outreach potential to business? industry? or schools?

What about sharing a program specialty resource person with other camps if one camp alone can't "afford" his fee? What about extending the camp season? What about expanding program possibilities on available site acreage?

The planner will encourage directors and staff to develop an expansive attitude in considering program opportunities. It takes practice and dedication to remain flexible, adaptive and sensitive to new opportunities, problems, goals and needs. The key ingredient is maintaining maximum program flexibility within acceptable environmental, structural and people standards.

Economic Problem Prevalent

The most prevalent and readily identifiable problem at camps seems to be general economic conditions, but using the economic syndrome as a catch-all for problems must be avoided.

I have observed no easy procedures or formulas for establishing, achieving and operating within a budget. The closest solution to economic problems that I have experienced is based upon: commitment to an attitude; judicious use of physical resources; and expanding program opportunities.

The planning process needs to commence with these later points and an awareness of budget limitations. The futuristic planning process should not, however, be shackled by budget constraints. A responsible planner applies design ingenuity to maximize physical and people resources consistent with wise economic planning. Anticipated schedules would be included as well as budget commitments and phasing flexibility to adapt to unforeseen needs.

In summary, a key ingredient in a long-time planning process is to cast off all inhibitions when defining problems. □

Planning and Development IV.

CAMPING MAGAZINE, MARCH 1977

The following information is directed either to the organization or agency planning a new camp, or to a newly appointed or elected Camp Planning and Development Committee. These guide lines may be adapted to a variety of situations—new resident camps, day camps, conference and retreat centers or the redevelopment of existing camps. However, for practical purposes let us assume that the information is directed to a committee that is charged with planning and developing a new/resident camp. Since the topic "Selecting a Campsite" will be presented in a later issue, this article omits the site selection process or considerations.

Committees evolve in many ways and rarely start from the same point. The committee should be small enough to work effectively. Factors such as interest, talents, geographic representation, and time constraints are considered in determining the composition of a planning committee.

Assumptions: 1) That the organization or agency is committed

(continued on next page)

to planning and developing a resident camp; 2) That it can give an affirmative answer to the questions set forth in the first article. "The Challenge of Planning and Development"; 3) That they are committed to involving the expertise of an experienced camp planner.

The chairperson is faced with some early hurdles, analysis of task, establishment of procedure, and appointment of committees. It has been demonstrated that the initial efforts of the committee as well as the processes that follow can be greatly enhanced if a professional manager-director is employed at the outset, and the services of an experienced camp planner is retained as quickly as is feasible. Depending upon his or her experience, the manager-director may advise on committee structures, committee responsibilities, and may generally assist in handling the myriad details in the various steps and phases that will lead to the ultimate goal—a functional and operational camp.

Role Justified

It isn't often that an agency has sufficient funds to develop an entire camp in a single phase. Therefore, a manager-director may be justified at this stage on the basis of his role in public information promotion and fund raising. Aside from his contribution during the planning stage, his presence becomes increasingly important in the role as coordinator during the initial development stages. One's imagination does not have to go far afield to recognize how fortunate an organization, agency or private camp owner would be to begin a camp operation with a director that had assisted in formulating the philosophy, objectives, and camp program, and to have one who has observed the physical plant emerge from the raw land. Utopia, yes! But it has been done many times.

An experienced camp planner can guide the committee and the manager-director through steps that lead up to and through the Master Plan phase. Indeed some of the considerations below may be a part of the Master Plan effort depending upon the approach or procedure followed by the committee and/or planner. (The procedure for selecting a camp planner will be covered in an article, "The Use of Consultants," scheduled for the June issue of Camping Magazine.)

Consider These Tasks

Listed below are some of the tasks that may need to be considered. Naturally all of these are not necessary in every situation. But the "team" approach—the committee, manager-director, camp planner and other resource agencies or persons necessary to meet the project requirements is essential in establishing a "direction."

Market Study—Who will the camp serve? Is there a demand for this type camp? This study would be especially important in establishing a private camp.

Feasibility Study or Pre-campaign Survey—When conducting a capital campaign it is wise to first conduct a feasibility study. Such a study would determine the probability of success.

Capital Campaign — Capital campaigns are often necessary, especially when developing a new resident camp. It should be pointed out that the Master Plan for a camp is completed in many instances prior to beginning the capital campaign. The site plan, cost estimates, and architectural renderings become very impotant visual "tools" during the fund drive to help assure effectiveness.

Interest Survey—If the proposed development is to be a multi-purpose camp, retreat and/or conference center, an interest survey is an important consideration. The information from a valid sampling can be very helpful to the committee in determining the kinds of facilities needed as well as the projected use.

Agency's History of Organized Camping—The location of resident camp operations, attendance, program direction, age groups, leadership, facilities, successes and failures will be valuable background information.

Consider Trends

Trends in Organized Camping (and Retreats), Outdoor Education—We are living in a changing world. Future planning in this field should incorporate the latest trends in organized camping and retreats. If it is a church camp and retreat center, the committee would no doubt consider the total Outdoor Ministries program as well as the current practices in the conduct of Christian education programs in an out-of-doors setting. Outdoor education is a major consideration in most camps today.

Visit Camps—Explore and investigate successes and failures.

Standards and Requirements — What are your own agency or organization's requirements pertaining to health, sanitation, safety, age and camper-counselor ratio? The committee should be familiar with local and state codes on Resident Camp health, safety and sanitation. The proposed Federal Youth Camp Health and Safety Act is still pending in Congress. However, many states are in the process of updating or writing their own codes. It is suggested that appropriate resource persons or agencies be contacted. The Federal Occupational Safety and Health Act (OSHA) which deals with employee working conditions should also be studied. ACA Region, Section and District leaders, especially the Chairpersons of the Standards and Legislative Committees, could advise on health and safety standards. A Certified Standards visitor would also be knowledgeable in these areas.

American Camping Association Accreditation Standards — It is strongly recommended that the agency develop and operate the camp so it meets these standards from the outset.

Philosophy and Objectives — The committee should update or write its statement of philosophy and objectives in light of today's needs. Goal setting could also be a beneficial exercise for the committee.

Program/Activities—The camp program and activities will naturally evolve from the above objectives.

Facilities — The committee should prepare a tentative list of facilities needed to meet administration, operation, management, maintenance, housing and health, safety, sanitation and program needs.

Used by Planner

It should be pointed out again that most of the tasks presented above are accomplished after the camp planner has been retained.

The planner may include any or all of these as a part of his "package" of services.

Campsite — The committee should make sure that ingress — egress is adequate. Steps should be taken to review the deed to be assured that there are no easements, covenants or restrictions that would adversely affect camp development and operation. Often times it is discovered that the deed provides ingress—egress to adjoining property. The deed and/or agreements should be checked for mineral, mining, timber, grazing, and farming rights and/or period of occupancy by former owner.

Property Boundaries and Corners—Every effort should be made to clearly establish and identify each corner and all property lines before a camp planner is retained.

Adjoining Land Uses — Although those who made the decision to acquire the site checked out the existing and proposed uses of adjoining lands, it is entirely possible that negative conditions could have developed.

Zoning, Environmental, Conservation and Other Land Use Constraints—Trends and controls in these areas have shocked many developers and camp planning and development committees in recent years. These should be thoroughly checked out with appropriate local and state agencies.

After an agency acquires a campsite there is often increasing pressure to begin using the property. It is during this interim period that irreparable damage to the natural environment occurs. Here are a few things that the committee should attempt to avoid prior to retaining the camp planner: access road into the interior of the property; lake construction; overhead utility service, including easements for electric transmission lines; temporary facilities that become eye sores; well drilled in the wrong location; wood products management plan; uses by neighbors, visitors, or the agency's own groups, that may prove to be difficult to change or control. The use of two and four wheel off-road vehicles on such property also does considerable damage and leads to erosion problems. Hunting should be prohibited. The camp planner can work toward a suitable land use plan if presented the opportunity to begin with the raw land.

Organizing for the task of planning and developing a resident camp is a challenge. These suggestions are adaptable to many situations. It is hoped that they will be helpful. □

Planning and Development V.

CAMPING MAGAZINE, MAY 1977

Good camps don't just happen by chance . . . All too often, sites or existing camps are acquired with little or no thought of elements central to the purpose of the anticipated program. A "good" piece of land becomes available at the "right" price and it is purchased. An existing camp or resort becomes available at the "right" price and it is purchased with the intent to initiate and implement a camp.

What kind of a camp? What kind of a program? Can it possibly be an extension of community?

These and other questions are often not asked, much less answered. Let's enumerate a few important considerations to camp location:

Proposed Facility Use

A group going into the camping business should first record what its objectives are and what it hopes to achieve. A basic understanding of philosophy, objectives and program had better be known prior to any acquisition, not afterwards.

PHILOSOPHY—What are you? What is your motivating arena of service, mission or community?

OBJECTIVES — What do you want to do? What do you want to be? What image do you hope to create?

PROGRAM — How do you hope to achieve your objectives? What activities will create a progression of learning opportunities?

These three ingredients are key to the establishment of knowledgeable criteria for the location of a camp.

A well-planned camp provides a quality camping experience whenever physical considerations mesh with philosophy, objectives and program. The following list is a firm foundation for any camp planning.

People Factors

Initial factors that need to be considered include: ECONOMIC RESPONSIBILITY — Does the group have a good grasp of future economic requirements to create a quality camp facility? Does the group have any economic track record?

CONSTITUENTS / COMMUNITY — Where are your customers? Who is the camp for? Are these enough customers? What avenues of marketing are open to market the facility to the potential users?

Plotting known constituent factors on a map should begin to define an area of people contact. This map should also begin to illustrate geographic relationships.

TIME/DISTANCE — What distances are constituents willing to travel to get to camp? What time requirements to travel those distances will not compromise the camp program?

These questions are especially crucial for day camps and resident camps alike. A time/distance map overlay on the constituent location map should begin to define areas of potential site search.

Some rational decision or capacity to define geographic areas to initiate the site search should now be possible.

Site Factors

It is important to become visually familiar with the mapped geographic area. Develop initial reactions on the basis of existing amenities within the geographic area.

A checklist of physical site factors that need to be considered

(continued on next page)

includes six specific concerns:

REGULATORY AGENCIES — The extent and jurisdiction of regulatory agencies may be surprising to most when considering the location of a new site. Comprehensive plans and zoning regulations of counties, townships and municipalities generally exist throughout most states.

Agencies that need to be considered might include the Watershed Board, Pollution Control Agency, Environmental Quality Council, State Board of Health, State Natural Resources Board, Property Owners Association and so forth. Contact with agencies and knowledge of requirements could save a great deal of money and time and could avert a potentially bad decision.

Don't forget to allow ample time for permit applications, review and approvals. If a timetable for camp implementation has been prepared, some variance should be allowed for within the permit process.

AVAILABLE LAND — On-site visual analysis of land within the defined geographic areas should include general suitability to camping program needs, usable land acreages to meet programming needs, and lastly, general land availability. Balanced site scale dependent upon program requirements can also be a key ingredient.

ADJACENT LAND USE — General land use patterns within any geographic area must include concern for compatible uses, physical pollution, visual pollution and hydrologic pattern of drainage. This latter element is most important when considering runoff patterns that may contain contaminants or create erosion impacts on the site under consideration.

EXPANSION POTENTIAL — The opportunity for expansion should never be overlooked. This would include program expansion possibilities on public lands and waterways as well as direct land acquisition.

NATURAL ELEMENTS — Environmental elements constitute one of the major visual impacts at any camp. Reintroduction of a person into the environment in a positive and expansive tone can motivate the camper or staff into a quality camping experience. Vegetation coverage and wildlife patterns can heighten the excitement and program opportunities on any site. A range of topographic patterns can be used to enhance separation of program spaces as well as accentuating interrelationships.

Soils suitability to withstand programming impact of foot or vehicle traffic is important. Soils capability to effectively and efficiently accommodate sewage and other utility requirements needs to be evaluated.

Water accessibility enhances most any camp program, both visually and physically.

MAN ELEMENTS — Man-created elements including accessibility to all weather roads, existing structures renovation, flexibility to meet program needs and general availability to public utilities can ease and expedite permit processes and financial planning. A great danger in the presence of existing man-created elements is the tendency to let those elements compromise a stated camp philosophy, objectives and program. Watch out for this hazard!

Economic Factors

Last, but not least, in the consideration of any site is the economic framework and related timetables as a part of operational expenses

Consideration of this most important element in detail is held until the last so that it does not become a limiting factor that creates tunnel vision when considering program opportunities and needs. Long-term financial planning must be an integral element of the location criteria process on the basis of financial accountability.

These are many of the elements that should be considered and implemented in every decision regarding a camp's location. Don't be tempted to take any short cut or skip any of the steps. Happy hunting! □

Planning and Development VI.

CAMPING MAGAZINE, JUNE 1977

We live in a planning oriented society. The need and value of planning has been presented in earlier articles in this series on Planning and Development

Agencies and organizations offering camping programs are seeking many types of professional assistance. Available consulting services in this field are numerous. They include, but are not limited to, feasibility studies, management of capital fund raising campaigns, site selection, master site development plans, working drawing, specifications, cost estimates and, if project is to be bid, contract documents and bidding forms, and supervision of construction.

Many existing camps are retaining consultants to revise and upgrade site plans, redesign kitchens or other service facilities, prepare organizational, personnel and management plans, establish maintenance programs, upgrade food service, assist in development of outdoor ministry, outdoor education programs and others.

Consultants: Who are they?

It has been well established that camp planning is a specialization that requires expertise not always found in the average professional firm. Oftentimes firms and individuals perform work clearly out of their field of expertise.

It is obvious, after reviewing the services needed in this field, that persons from many disciplines are involved in meeting the planning demands. They include, but are not limited to, landscape architects, architects, engineers, and specialists in outdoor recreation-education, outdoor ministry, camp administration and others.

The kind of work to be performed is usually clear, and there should be no problem in determining which professional(s) to employ. However, it is stated for emphasis that the consultant and/or firm chosen to prepare a master site development plan should be knowledgeable in camp operation, management, main-

tenance, programming, land-use planning and experienced in camp planning. They should also be thoroughly familiar with ACA Standards and the codes and rules and regulations of the state in which the service is being performed.

The emphasis here on selecting a planner-consultant to prepare a master site development plan. Agencies seeking this type of service are urged to carefully analyze their needs and detail in writing the exacting requirements of the project as they are envisioned at the time. Then establish a procedure for selecting a planner-consultant. The client will soon discover that each planner may have a different approach to the planning process and that the levels of services and expertise vary substantially.

1. Valuable time is wasted interviewing a large number of consultants. It is suggested that you select two or three of the firms or consultants which appear capable of meeting your needs. Check out references. If possible, visit projects (comparable to yours) completed by those being interviewed.

Check Financial Status

If yours is a large project, check firms' financial stability. List those selected in order of preference. This should be based on qualifications, experience, reputation, existing work load and other relevant factors. Are they members of appropriate professional organization(s)? Are they familiar with ACA Standards?

A consultant brings to a client the experience gained from his "successes" and "failures." Therefore, they may have suggestions on a better approach to meeting the requirements of your project. It is suggested that fees not be discussed at this point. If requested, however, the consultant may give a minimum-maximum range based on similar projects he or she has undertaken. The client is urged not to place primary emphasis on fees. The major consideration should be on qualifications and ability to perform the task. Consultants should never be asked to "bid" for their services.

2. Select the consultant that can best fulfill the requirements of your project and agree upon a work schedule fee and a payment plan.

3. Require a written agreement with the consultant. It should describe the services, the responsibilities of both parties and in some instances work schedule, fee and method of payment.

Challenge Rationale

As the planning process evolves, it is strongly recommended that the client challenge the rationale for solutions that the consultant submits. Through questions, cause justification for every facet of the plan. Why? Hopefully, possible mistakes will be avoided, that is, errors in judgment that the camp director would have to live with.

It would also be assumed that it will be unnecessary to retain a second consultant to evaluate what the first has planned. This duplication can be very frustrating to a Committee or Board. It can also be expensive and time-consuming. The necessity of securing a second planner is assurance that the wrong person or firm was selected initially.

The subject of fees, methods of payments, ethical considerations and other topics related to the use of consultants will be presented later in the series. □

Redesigning Multiple Camp Facilities for Year-round Programs

by Patricia S. Loheed

CAMPING MAGAZINE, APRIL 1979

Planning choices for allocation of people and money become difficult as these resources become scarce. For nonprofit and agency camp operators with multiple camp facilities to manage, operate and fill, these choices have become a maze of seeming contradictions. A clear understanding of two factors can help cut through the confusion and motivate planners toward better strategic planning.

The planners should first have a clear understanding of the population they currently serve, with specifics of age, geographic origin, return rates, and so on. They should know why their program satisfies, or does not satisfy user needs. From this "market research," goal-setters can establish what the future shape of program offerings should be and thereby "get-a-handle-on" the type of facilities necessary for the future.

The second factor, which is the subject of this article, deals with the ability of a site or sites to meet program demand. What follows is an annotated list of evaluation criteria that this consultant uses in judging sites and their ability to satisfy program demand for the present and the future. Examples of the type of analysis that can be used in each case are illustrated. Planners should be careful; the depth and quality of evaluation and analysis should be proportional to the gravity of the decision being made—that is, do not do a yearlong study to locate a new shower house.

In many cases the sheer cost of maintaining multiple sites is cause for major overall evaluation. In one New York case, the replacement of a major dining facility, in addition to improvements required by the state health department, acted as a catalyst prompting an overall evaluation of sites and future demand. In all cases it is important to have the market research in hand when coming to definitive conclusions about future site ownership or development.

One agency, with some 18 sites in Massachusetts, found that not one of their three resident camp sites could fully satisfy the year-round program that they projected. It is doubtful that they could have come to this conclusion if they had worked from the premise: "We have these sites; what can we do with them?" The agency acquired land adjacent to their best site, having sold others, and streamlined their property portfolio, and today, they are in a development program.

Since the selling or trading of closely held camp property is a sensitive issue, it should be approached carefully. From observation, those who have had the most success are those who have gone through a pragmatic review of needs and property resources with heavy involvement of constituents in the process. In many cases, new owners such as a conservation commission, have allowed continued use of a portion of the property.

Evaluation Criteria:

Location. Where are the sites in relationship to the geography served? How do they relate to the population distribution over the area? What is the future prospect for the location? Will a new interstate interchange change the character of development in that area? What are the plans of the adjacent state forest land? Questions such as these help clarify the location assets and handicaps of sites. It can help distinguish between the value of a smaller, older, closer-to-population site and a larger, newer site at a greater distance.

Access. How much trouble is it to get to the various camp sites? Is it possible to reach the camp site by public transit? Is the road plowed in the wintertime because the caretaker's children ride a school bus? What are the driving time-distances from the site to major population areas? What is the characters of the camp access road? If, like in one 3,000-acre site in the Adirondacks, the road in cuts down a north facing slope, the site is inaccessible by car in winter months, but snowmobiling and skiing are alternatives.

Another part of access is the visibility of a chosen site or facility within a community. Some camps which function as a program center with daily use may want to be highly visible for public recognition, where other facilities may want to keep a low profile, particularly if the site is only used seasonally and there is no resident caretaker.

Regional and historic context. With camp owners often being absentee landowners in communities, it is important to recognize the context in which they operate, particularly the history of the immediate area. Very often such recognition will yield new possibilities as far as program. What was the previous use of each site? What pattern did it take? The original settlers of land were pragmatic in their site planning and functional use of the land, being closer to and more subject to the whims of nature than we are today. In one site it was the use of abandoned mine and forge sites, in another it was the collection of farm artifacts from an early 1800s dump and barn foundation, in another it was the discovery of a 1780 mill foundation along a stream bed. One of the best sited dining halls in Pennsylvania is on top of the foundation of a previous dairy barn.

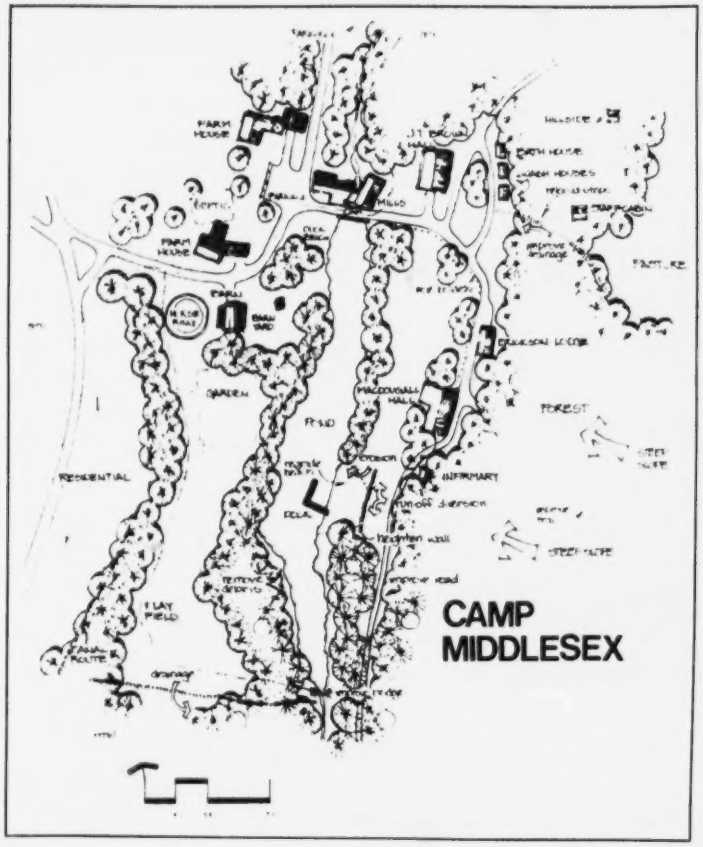
Soils. A clear understanding of the soil capabilities of any site, with the underlying geology and hydrology will provide an index for development capabilities. Because many campsites are located on marginal land that was not highly suitable for agriculture or development, their development limitations are often as great as their scenic properties. Where camp use was limited to seasonal activity in warm weather, these limitations were not as great, but as many sites have moved into year-round programming these limitations have been felt. In most cases, even the most severe soils limitations can be overcome, if one is willing to spend the money and to put up with the disruption of the natural

environment, and if no environmental restrictions are applicable. Generally, lands which have been actively farmed represent the soil types which are most suitable for intensive recreation use. However, the open-field, athletic complex is not the image for which most camps are striving. Many camps would benefit from more manipulation of the natural environment for the creation of spaces for camping. Problems of erosion, soil compaction, and poorly drained soils greatly handicap many programs and they are rarely budgeted for long-term solution.

Topography and slope. The landform of a camp acreage dramatically directs program activities and facility development. Very flat landscapes with 0 to 3 percent slope have trouble with drainage and are prone to be wet and soggy. Moderately steep to very steep slopes from 9 percent and up are difficult for road construction, septic tank, and sanitary system disposal. They also present erosion problems and increased expense when used as building or tent platform sites. This leaves a very narrow range of landscape on which to locate and implement program activities without muddy feet or erosion problems, much less heavy cost. Conversely, many of the most memorable camp landscapes are seen from the top of hills and escarpments and are the objective at the end of favorite trails.

Vegetation/wildlife. While these are are two different factors in a camp landscape, they are so tightly meshed that they are often jointly evaluated. The health and diversity of the vegetative cover on a camp help create the visual image of a location as well as impact its program capabilities. Often only the forested areas are treated as "camp landscape," many times at the expense of meadows, open space, and wet areas that function as valuable program space as well as viable food sources for animal populations. Many agency camp owners lack the understanding or the resources to actively manipulate their vegetation and manage the wildlife populations as most farm owners do.

True conservation of resources implies an active role in property management, rather than passive preservation. Those sites which will yield the greatest variety of landscape, vegetation, and wildlife are the ones which can meet a varied year-round program demand. Inherent in this management strategy is the disruption of the natural visual environment with tree harvesting, drainage diversion, and grubbing and clearing. If these



improvements are well planned considering the natural drainage, exposure, and natural seeding, recovery time of the disrupted area will be brief if no other constraints, such as soil compaction, are present.

Hydrology/water resources. Very often the evaluation of a camp's water resources are limited to their pond, lake, or swimming pool. A complete review of the water resources on a site needs to be made to adequately evaluate the long-term usefulness of a site. This includes looking at ground water supplies for water supply and fire fighting potential. If the water table is near or at the surface, it may be a deterrent to use or to development.

The pattern of surface drainage should also be cross-referenced with existing development and circulation so that potential conflicts can be resolved before they become high-cost site planning problems. The other water features on a site such as wetlands, brooks, springs, waterfalls, and so on should be inventoried and mapped. In many cases these smaller natural water amenities are completely overlooked in program planning even though they offer a multitude of water contact program possibilities such as "creek walks." Proper management of streams and ponds is a major issue, particularly where empondments have been man-made. Problems of siltation and algae growth are rarely dealt with on a preventive basis.

Existing development. An evaluation of the functional layout of existing buildings and circulation should be made, identifying where the existing system is in conflict with the natural systems of the site or is dysfunctional from a program operation point of view, such as delivery trucks backing over the ball field every time a milk delivery comes. Many agency camp layouts were made on a decentralized plan when the expectation was that facilities would be used in warm weather only. Such plans are often difficult and expensive to adapt to year-round program functions, with sanitary disposal systems and distance between units being major problems in snow weather. With the advent of the snowmobile, these dispersed facilities are also difficult for even an agile resident caretaker to keep an eye on and to deter vandals.

Future development program potential. The majority of the writer's agency clients have looked at their existing sites with the idea of

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consolidation and selective winterization of their facilities rather than the development of massive new facilities. In many cases, when the wet areas and the steep areas are subtracted from an available acreage, very little actual land suitable for intensive recreation use is left. Often this land is separated from the existing developed area by natural features such as hills, ridges, or water bodies which eliminate it from serious consideration. Thus in most cases, new development and expanded program potential involves careful rehabilitation or removal and redevelopment of existing areas. In many cases winterization has meant the potential loss of the "rustic" image so highly valued in camps. It has also meant the development of more structured vehicle and pedestrian systems, with actual surfacing of intensively used exterior areas.

For old-time campers the advent of blacktop, wood chips, and crushed stone and underdrainage makes a camp core area look too much like a motel or a conference center instead of a camp. If these areas are planned ahead and budgeted for, they can often be built by campers and achieve a more naturalized appearance. The use of decks and stone can also relieve some of the too urbanized look.

In looking at implementation and follow-through on camp planning projects after a number of years, the writer finds a great correlation between those groups which were articulate clients, with a clear understanding of their needs and limitations, and those groups which actually achieved their goals. A good consultant educates a camp client in developing self-help skills in the planning process, to assure continuing implementation of a plan long after a development contract is completed. □

Remodeling and Winterizing

by W. Glen Wallace

CAMPING MAGAZINE, JANUARY 1974

THERE IS a growing realization that camping, if we use our imagination and initiative, has increasingly more to offer to individuals and groups. All year around programming provides many of the answers to the question, why remodel and winterize?

We can serve more people.

Our facilities can be used to better advantage.

Year around retreats are becoming more popular.

There are new recreational sports which we can serve such as cross-country skiing, and even snowmobiling (although some of us shudder a bit).

We can provide facilities and opportunities for traditional winter programs such as skating, downhill skiing, ice fishing, hockey, outdoor camping.

Winter use provides additional income.

We can provide camping opportunities for those who find it difficult to take a block of time in the regular camping season.

SOME QUESTIONS to ask before winterizing are:

How does winterizing fit into your total program and physical master plans?

What are the codes, ordinances, laws, and zoning which may affect winterization?

Do you have "non-conforming" facilities, and if so what are your problems in winterizing? (Non-conforming facilities are those which are permitted to continue even though they do not meet present standards, because they were built before those standards were adopted).

To what extent do you want to winterize? Partially? Completely? Progressively?

Do you want to make a "campy" building habitable by providing heat and insulation only? Or do you want to go the full way by winterizing the plumbing and providing automatic heat?

Can winter use of spaces be compatible with summer use?

Can volunteers do all or some of the work of winterizing? Consider pro's and con's.

What are other considerations which winter requires, such as access, snowplowing, parking, etc.?

What will winterizing cost?

Are your total facilities adequate and equipped for outdoor programs? If not, what must you do to provide them?

To what extent should you do some remodeling to better meet the needs of your present program, especially changes in program, at the same time as winterization?

What are the changes necessary to meet new concerns and requirements, such as facilities and considerations for the physically handicapped?

Finally, are your present facilities worth investing the money to bring them up to full 12-month a year program?

MANY SUMMER BUILDINGS are relatively easily winterized. Some have problems. A major consideration: to what extent do we winterize? Is it simply transforming a purely summer building which is a shelter only, to a comfortable building with stove heat and adequate protection against wind, rain, cold and snow? If the answer is yes, then this is relatively easy. However, if we go the full way and provide automatic heat thermostatically controlled, with kitchen, toilets, etc., then we have many more considerations.

THE ELECTRICAL SYSTEM is an imperative, regardless of which way we go. This is so important and possibly so costly that it may be the major determining factor in deciding whether or not to go ahead with the project. There may be some buildings where we do not plan on using electricity, but it is doubtful that this is very often the case.

If you have an old system, you may be required to redo it completely, since it may no longer meet codes if you make substantial changes or additions. So here is a prime question: is your present system acceptable? Does your panel board meet modern requirements? Most camps are in areas which require electrical inspection. Some authorities require a written notice before you even start. Most areas require a complete inspection of new work before you cover the electric wires. Talk early to your inspector. Even if permitted, use of volunteer labor to install electrical work can be costly and require redoing more of the work than you think.

This may be the time when you should look at the adequacy of power at your electric panel in the building or buildings. Winterization and its concurrent remodeling may add to the power requirements. This may also require you to look at the service lines to the building. If they are inadequate and must be replaced, we recommend that the power lines be installed underground. This may mean that you will want to install a transformer close by, which in turn may give you the opportunity to ask the power company to install its primary lines underground to a nearby grade level transformer. Many power companies will go underground to this new transformer if the camp pays a modest fee for it. Underground power lines have advantages which do not have to be pointed out.

Next, let's consider what has to be done to assure comfort against the elements. Obviously this requires adequate insulation and protection against infiltration. If the walls are now bare studs, then use "full thick" batt type insulation, being sure that the batt has a moisture resistant sur-

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face on the room side. However, install the electric wiring and electric boxes before the insulation.

If the ceilings are bare rafters and roof sheathing, you may wish to follow the same method as for the walls. However, it will probably be better to install a new horizontal ceiling under the collar beams, with the same type of insulation laid on the new ceiling. The surface applied to the walls and ceilings can be any of a number of materials such as plywood, drywall, prefinished paneling, wood paneling, chipboard, plaster, fiberboard, etc.

Additional granular insulation may be laid on the batt type ceiling to increase the insulation thickness. If the ceiling is thoroughly insulated, then the gable ends of the building should be left partially open. This is to prevent the roof from becoming warmer than the outside temperature. This often produces thawing and moisture backups with freezing at the eaves and valleys, and eventually leaking. Install louvered ventilators (metal or wood) screened on the outside to keep out birds and bats.

If the present ceiling is unobstructed to the roof, where the sheathing forms an attractive finish, then there is a real problem how to insulate and preserve this attractive ceiling. If the shingles are at a point where they need replacing, then the solution is to remove them and cover the sheathing with an inch or two of rigid insulation, then 15# felt, then new shingles. If your shingles do not need replacing, there appears no way that you can save the exposed roof structure.

If your walls and ceilings are presently covered with a suitable surface, and if the electrical system is determined to be satisfactory, you may wish to insulate by blowing in insulation through holes bored from the outside into the voids between studs. However, this does not have the advantage of a vapor barrier as you would have with batt type insulation. If the electric system needs checking and additions, you may be wise to remove the present paneling, and replace after insulating and making the necessary electrical changes. It is quite possible that installing a new wall paneling would be worth the expense.

How about providing warm floors? If you have a basement, then the heating system would probably be placed there. This would keep the floor above relatively warm. However, if you have a joist floor over a small crawl space, you must insulate around the entire perimeter of the building.

Usually the crawl space is so limited that it is almost impossible to insulate the exposed wall surface of the foundation from the inside. One way then is to dig down around the foundation, install moisture resistant rigid insulation against the masonry wall, then backfill. Any insulation necessary above ground will have to be protected by some waterproof finish, with a drip cap over it at the base of the exterior finish of the insulated wall above. If your building is on piers or posts you have real problems! Insulate between joists and cover under with inexpensive material. If your building has only a crawl space under the floor, exterior walls should have a number of screened ventilators. These are closed in winter and opened again in spring.

If in a cold climate, and your building is not already provided with storm windows, it is well to equip all windows with combination wood storm and sash and screens. Combination wood storm and screen doors are also advisable. It is even better to have weather-stripping of doors and windows in addition to the combination installations. In situations where hard use of exterior doors is expected, aluminum doors should give way to wood.

If you have concrete slab floors on grade, then you may want to install perimeter insulation as previously suggested. Banking snow up around the building is often used as an additional method of insulation at ground level. (Be sure that grade falls away so that melting snow in the spring will not run into the basement or crawl space.)

HEATING NEEDS consideration even if you intend that the building be mainly a protection against the elements. You may wish to have a minimum type of heating. This could be a sheet-iron stove, a free-standing system such as a Franklin stove or a prefabricated fireplace, or it could be a masonry fireplace. If the latter is the case, use a prefabricated boilerplate liner system which has warm air registers above the fireplace and cold air inlets at floor level. Some places use a simple kerosene stove, but I have dim views of this from sad experience.

If you wish an automatic heating system you have choices of oil, gas, electric. Heat distribution may be by gravity, or it may be by forced warm air, water or steam base registers, by unit overhead heaters, or by small wall heaters either gravity or fan type. Forced warm air requires fans which can be noisy, especially if a small building. Unit heaters are apt to be noisiest.

If electric heat is used, suppliers often urge more insulation than for other types of energy, especially in the ceilings. On the other hand electrical heat has the advantage of being easily controlled, with no moving parts, which is an advantage where different and inexperienced people are using the premises.

In situations where ventilation is required, the forced warm air system has an advantage, as the ductwork can be used for heating and ventilating, and also air conditioning where desired.

WATER SUPPLY and distribution lines to the buildings must be well below frost level. If the existing lines are not below freezing level, then you may wish to install a completely new system of piping, placed at the proper depth. If this means a substantially long run from the existing water supply, you may want to consider a new water system closer to the buildings, especially if there are several buildings needing water in close proximity to each other. The cost of a new well may not be much different than the cost of extending present lines at the depth required. A submersible pump system has the advantage of requiring no protection against freezing, since the pump is much below the freezing level and the water lines take off from the well below freezing. Installing such a secondary well also has the advantage of providing water in an emergency through an interconnection (if allowed in your area) if the first well "goes out" temporarily.

SEWAGE DISPOSAL SYSTEMS, in a number of cases, need little or no modification for winter use. If the septic tank is covered with enough earth (one or two feet depending on your latitude), the bacterial action which produces heat may be enough to prevent freezing. However, some systems' tile drain fields may be too close to the surface and may freeze up at times. You should have some technical advice here. Maybe in this case it would be enough to cover with straw or leaves in the winter, but of course the best method is lowering the tile field.

If the use of a camp is on an intermittent basis in the winter, there

may not be enough sewage to keep the system efficiently operating. We would advise close cooperation with your health authorities in all parts of your alteration and addition program.

IN SUMMARY, consider the following:

Can the costs of remodeling and winterization be materially reduced by volunteers? The answer can be "yes" if there is expert direction of the work crew. However, volunteers make the most contribution in other than the electrical and mechanical fields.

In all planning and implementation, involve as many experts as you can. Especially involve your planning and zoning people, administrators of applicable building codes, health authorities, plumbing and electrical inspectors, fire marshalls, soil conservation people, township and county authorities, pollution control agencies, etc. We find that these people are eager to help. But if you go ahead, especially without those from whom you require permits, you are in for difficulties. Make friends of them and they will help. And don't forget architects and engineers, building contractors and skilled workmen.

Carefully worked out ahead, plans for winterization can produce facilities which will accommodate programs to enrich the impact of your camp immeasurably.

Realistic Master Plan Aides Long-range Camp Growth

by Arthur H. Mittelstaedt, Jr.

CAMPING MAGAZINE, SEPTEMBER/OCTOBER 1974

FOR THE PAST forty or more years, the Master Plan or Camp Master Plan was a term that applied to the cure all. It related to a mysterious and ominous methodology of evolving the "grand design" or "physical layout" of a camp property. It was usually an end in itself as opposed to the means to the end. Today the Camp Master Plan is more realistic as it signifies a process rather than a product. The process of anticipating the camps long range requirements and defining (in text as well as in graphics) the program, plant and management necessary to deliver the services to meet the requirements in immediate and ultimate stages and allowing for periodic review and change due to new conditions and situations is today's "Master Plan".

Camps serve many important purposes in the overall satisfaction of the educational, recreational and related needs and interests of the constituents. They, like all other services, must be chartered by corporate aims, goals and objectives, in essence, their purpose. A plan is the next logical document to have in order to chart the course for the organization to take to insure compliance with its charter. A plan is, in essence, the tool and technique for insuring you're going to get where you intended to go.

An analogy can be drawn to the navigation sailing or flight plans, logs and charts of yesterday and today. It is also comparable to the computer program of today and tomorrow. Obviously it is more than the "pretty picture" of the past. The Camp Master Plan must be a viable as well as flexible document that considers the camp as a delivery system. It must be cognizant of dimensional, temporal and climatological influences as well as the social patterns of the users and physical character of the resource at the same time it carries out its implied reason for being. It must follow a process in its formulation, step-by-step accomplishing tasks that each hinge upon the other. It's like following legs of a journey going from point-to-point. Today this is often referred to as CPM, PERT or flow charting. Most management methods incorporate this approach in their problem solving and decision making model. The formulation of a Camp Master Plan is no different than applying modern management systems.

Thus, the Camp Master Plan of today should be a far cry from that of yesterday. It is a prospectus of the camp to insure sound investment by the stockholders, i.e. the taxpayer, church supporter or bondholder, to insure sound commitment to program and activities; to insure sound development of plant and facilities; to insure sound management of personnel and procedures and to insure sound enhancement of resources and betterment of the user. The Camp Master Plan must be relevant to and cognizant of activities as well as facilities. It must introduce an order to the management of the service delivery considerate of budgeting, purchasing, scheduling, timing and a host of other factors to solidify the marketability, feasibility and appropriability of the camp.

As land supplies are committed and leisure demands increased, the camp and the Camp Master Plan become more valuable. The researching and planning process of generating the product should have considered all factors that make up the Camp Master Plan. It should have involved the owners, the operators, the neighbors, the users, the servicers and suppliers, and the governmental and voluntary agency officers in compiling the data, evaluating the data, and determining the resultant alternatives and choosing courses of action.

Camp Master Plans establish and reflect the needs and desires of the user and relate these to the attributes and capabilities of the land in balance with the mission of the agency. The agency efforts which adhere to and allow for the possession of a Camp Master Plan accomplish the following values.

- They conserve natural resources.
- They maximize artificial resources.
- They avoid safety hazards.
- They insure security controls.
- They provide for utilities ahead.
- They preserve space and features.
- They establish experience.
- They obtain operational and capital costs ahead.
- They schedule priorities and phases.
- They cover expenses with revenues.
- They can measure effectiveness.
- They can assess relevancy of services.
- They can involve people in process and many other values

The process of Camp Master Planning is logical and vital to the essence of effective camp organization and administration.

The agency efforts which also adhere to and allow for the product of a Camp Master Plan accomplish the following benefits.

- The Camp Master Plan and each recommendation can be made the subject of feature news releases on the camp mission.
- The Camp Master Plan can be the subject of meetings of staff and officer discussions, camper or parent presentations, or Service or Chest submissions.
- The Camp Master Plan can be the subject or theme of campers in program activities.
- The Camp Master Plan and its maps and diagrams of individual areas can be reproduced in slides, or displays for lectures, workshops and meetings.
- The Camp Master Plan and its component parts in color can be used in brochures, reports and bulletins.

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- The Camp Master Plan could provide source material for camper projects.
- The Camp Master Plan and the implementation of each objective of the plan would stimulate continuing private or public interest and support.
- The Camp Master Plan can provide the evaluative criteria for measuring effectiveness.
- The Camp Master Plan can be used to encourage sponsorship of certain recommended developments by industry, civic clubs, and interested individuals.
- The Camp Master Plan summary could be distributed widely to all interested agencies and individuals to engender support for its effectuation through funds, equipment or supply donations, and other money or material.
- The Camp Master Plan summary can be used extensively for day-to-day, as well as annual programming and many more benefits. The product of a Camp Master Plan is practical and essential to the presence of effective camp instruction and operation. Planning and plans are important and significant to the Camp of the Future.

Design Process for Site Planning

by Carl D. Johnson

Is Long Range Site Planning absolutely necessary? If you read June Stump's excellent article in the 1976 spring issue of the *Journal of Christian Camping*, I'm sure you must be convinced there is clear justification for a carefully documented long range site plan which is a necessity rather than a luxury. Ms. Stump points out many important basic guidelines for site selection in terms of accessibility, Physical and aesthetic characteristics, utilities, site amenities, and adequate in size related to program. Several critical aesthetic and functional problems commonly found in many existing camps were so clearly stated that we conclude, "That's so obvious, why didn't we thing of that?" Other problems are not so obvious; problems that relate to impact upon the delicate balance of the natural processes that enhance and maintain environmental quality. We must recognize that the tree and man function within their own distinctive environments both alone and together. Camp sites must be considered as an ecosystem; the sum total of all living and non-living parts that support the chain of life within a selected area. To measurably weaken one of the links could have a disastrous affect upon the whole. We must work within this web of life to achieve what June Stump states as a primary planning objective, "Camp building (all facilities) should be compatible with both the natural surrounding and each other." How do we achieve the admirable and absolutely essential goal? A logical systematic process of site analysis and design must be followed concurrent with a thorough statement of program objectives and priorities.

About the author
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The primary objective of the analytic process is to search out design potential of the site and the interrelationship of the many elements upon the land both man-made and natural. Major emphasis should be placed upon identifying the existing land patterns and forces which are at work, such as land form (topography), plant ecology, soils, climate, impact of the land around the site, and circulation patterns. Once these elements are clearly documented and interrelated a framework of physiographic land areas or units will emerge. The next step in the process is to define the program requirements systematically. This requires a careful examination of each of its parts, separately and collectively to determine a clear organization pattern. The written program should be summarized graphically showing the size and interrelationships of the various parts.

Out of the site and program analysis, two areas of design emerge. First, a physical framework is established and second, a detailed design concept emerges. The physical design framework which essentially expresses the natural order of the site is relatively inflexible and functions to maintain an orderly direction of growth with fixed capacity limits. Within this framework there is room for reasonable program changes over a period of time and flexibility enough to adapt to various design options, so choice is not pre-empted by setting up a physical design framework that is too rigid.

In order to achieve an appropriate physical design framework and detailed design concept for your camp program which optimizes the relationship between the site, buildings and its related program, a systematic study procedure should be established. With a consistent method of analyzing and evaluating factual information, many arbitrary decisions can be eliminated.

Basically, a logical process of solving a site development problem can be approached in the following phases:

A. Research — The understanding of all of the factors to be considered through the gathering of information *Pertinent* to the problem; a critical investigation having as one of its major aims, the discovery of new and relative facts contributing to a unique solution that can result in an outstanding program.

An effective site investigation and analysis process begins with accurate site surveys, and a site location map showing the influencing elements of the surrounding environment. A United States Geological Survey (USGS) map and/or a United States Soil Conservation Photographic Survey map would serve to illustrate off-site influences such as land uses, topography, primary drainage ways, roads, water sheds and major vegetation. USGS maps do not, however, serve as an effective base for more precise on-site inventories and plan layout.

An accurate topographic survey at much larger scales than USGS maps, one inch equals one hundred feet or a larger scale for small sites, the two basic sources are 1) a professional survey prepared by a registered surveyor or engineer and 2) a survey prepared by an experienced professional aerial survey company. For larger sites with a wide range of contour levels, vegetation, stream, buildings, etc. an aerial survey is usually less expensive than surveys prepared from field survey teams because of the difference in labor cost. The field survey is slightly more accurate, however, and therefore might supplement the aerial surveys where refinement is required during the construction phases.

Another advantage of the aerial topographic survey is the usefulness of the aerial mosaic from which the site information is derived. General vegetation inventories, climate effects, water quality, and many other site factors can be identified on aerial photos as interrelated overall patterns. What might seem to be

an excessive expense for accurate survey information in the beginning of the planning process will in the long run, save many costly mistakes caused by inaccurate base information.

B. Site Analysis — Abstracting from a confusion of facts and site inventories, the essence of their collective and interrelated meaning. We record and examine the following factors relative to their functional and aesthetic impact.

1. Natural Factors
   a. Land Form-topography
   b. Vegetation-plant communities
   c. Drainage patterns
   d. Surface water features such as springs, streams, rivers, lakes, marsh,bogs, water table, etc.
   e. Soils (soils can be mapped and basically interpreted from United States Soil Conservation Services inventories)
   f. Solid Geology-underlying rock structure of the site, degrees of permeability
   g. Climate
      1) Macro, regional
      2) Micro, particular climate within the site
   h. Wildlife-birds, mammals, reptiles, fish
   i. Erosion, chemical, water, wind
   j. Environment beyond site boundaries-views-noise impact, and other nuisances
   k. Scale of site in relationship to the human

While all of these factors are important especially in their relationship to each other, topography and vegetation have the greatest affect on the character and nature of the environment. To understand the impact of each of these elements both separately and collectively, will generally provide the opportunity and the constraints for environmentally sensitive development. The analysis of topography begins with the examination of its regional character. For example, the level plains of Kansas and the prairie lands of Illinois appear enormous in size. Endless views merge into the horizon. This is "big" sky country where sunsets are amplified and where every vertical element be it a tree or silo, is a focal point because of its contrast to the horizontal plane. Vertical focal points can "mark the place" while horizontal, quiet, prairie architecture can complement the base plane. The essence of this dominant level plane environment can provide the design for its appropriate and even dynamic use.

The rolling wooded hills of the northern glacial morains of Minnesota, Wisconsin and Michigan provide enclaves or enclosures where camp programs can be naturally segmented into precincts related to program use. One can literally live with the "human scale" of the hills to a point where the camper senses every detail of the environment. Trails follow natural ridges and valleys. There is a sense of shelter and the sky, is in balance with the entire scene rather than being a dominant force. Each basic geographical region of the earth possesses inherent topographic features that suggest and direct land development patterns.

Within each individual site, topography affects the aesthetic and functional development of land. The hilltops provide focal points and enhances the view while at the same time, exposing one to the impact of harsh weather. Topography forms enclosures, buffers, and visual screens. It provides the basic patterns for the camp community infrastructure; the roads, walks, trails, and utility systems. The natural drainage site patterns, swales, ravines, and intermittent waterways are shaped by land form.

Many local variations, in climate are influenced by topography. To understand these variations and harness them properly can provide an optimum situation for solar energy and energy conservation. For example, south and southeast slopes in the midwestern region of the United States are optimal for solar collection. North slopes are damper and colder in the winter. Valley sites have less air circulation and frost settles in the bottom land first. Cold air settles in the side slope ravines and flow downhill; an important factor to consider for air drainage. Land form shape the patterns and forces of prevailing winds. The influence of regional forces of topography on climate are even more pronounced. The planner should be aware of their impact upon shaping the plan and program.

Vegetation should be considered as a total plant community in terms of its ecological association related to all the forces of the environment. Ecological associations will vary throughout the world. The preservation of indigenous plant communities will in most situations be a major contributor to a quality environment. We also know that those particular plant species will survive under local conditions. Therefore, there are sound economic reasons to preserve and add native species as a supplement to the existing vegetation.

In terms of design opportunity the woodland canopy provides the shade plane that enhances the sunlit meadows and gives shape to the open areas. It defines edges where the supporting understory plantings provide natural runways and habitats for wildlife. the sheltered canopy of mature pine trees create natural quiet, sheltered outdoor rooms, the floor of which is a soft cushion of pine needles. Woodland thickets enclose zones where privacy and solitude can be experienced. Massive oaks on covering a prominent hill can identify primary entry or a special place in the camp program.

Functionally, the roots of plant materials stabilize the foundation of the earth, preventing soil erosion. The evergreen plantation buffers the winds from erosive forces. Meadow grasses slow down runoff and increases the absorbtion of water into the underground reservoirs. Plant materials are oxygen generators and carbon dioxide consumers. They contribute to climate control by buffering harsh winds, providing shade planes, and add moisture to the air through the process of transpiration.

Other elements are just as important to quality and function of the natural environment but not as visually apparent. Each must be evaluated as an integral part of the whole. For example, soils are indicators of stability for buildings and porosity for septic systems as well as indicators for entire ecosystems including flora and fauna.

It is critical that each of the essential natural factors be mapped and evaluated collectively so that the more fragile and valuable natural amenities of the site can be set aside as protected zones. The more stable areas will emerge as buildable development zones. Rarely do we find any two sites that are exactly alike. A careful, sensitive site analysis will identify assets and liabilities to discover its individuality. The goal is to adapt and shape the camp program to fit the assets or site amenities and ameliorate the liabilities. If carefully done you will achieve a unique program; a program like no other since it emerged out of the site itself.

2. Planning Constraints

Concurrent with the analysis of the natural factors planning constraints related to code guidelines, easements and functional program requirements must be thoroughly examined and documented. Traditionally these more pragmatic, precise engineering issues have been well delineated as a part of the planning process, therefore, most of the attention in this discussion has been focused on the analysis and documentation of the natural factors which in most of the camp developments that I have observed have unfortunately been neglected.

Planning Constraints, existing and proposed

a. Utilities-location, type, pressures, power capacities
b. Vehicular and pedestrian patterns
c. Traffic demands
d. Easements, rights of way
e. Zoning-type, restrictions
f. Building codes
g. Mineral rights
h. Water resources, quality
i. Soil boring data
j. Land use
k. Soil erosion and sedimentation control

C. Design Analysis

1. Program-at this stage of planning the program should be rationalized and organized in terms of the size and relationships of the various parts. The tendency is to recall and copy building and site plans of other camp programs which lead to fitting outmoded, inappropriate facilities to your needs. Therefore, rather than expressing the program in the form of buildings a graphic analysis of abstract rational diagrams encompassing the following is more appropriate:
   a. Relation of functions
   b. Space or sequence diagrams relating to the influence of site and function
   c. Circulation diagram, convenience and function of both vehicular and pedestrian modes
   d. Orientation and exposure-building and structure function with relation to outdoor area functions and appearance

It is very important to use accepted standards of area to people ratios for each function to determine adequate sizes for both building and site.

D. Design Expression

Design concept development. With the previous analysis one may now consider the practical details of sizes, shapes, materials and construction systems with basic design principles, such as unity, harmony, rhythm, scale, texture, color, contrast.

The design form which finally evolves from this logical, systematic thinking process will not likely be pre-conceived or arbitrary. The form expressed within the context of a long range site development plan will be sensitive to the environment preserving its aesthetic values and function: an appropriate physical framework for a program sensitive to the needs of each individual camper.

Site Planning:
Key to Land Stewardship

by J. Patrick Mitchell

JOURNAL OF CHRISTIAN CAMPING, MARCH/APRIL 1981

A camp could be pictured as a peaceful lake reflecting the surrounding hills and trees, or birds singing a cheerful song in the sunshine, or perhaps a snow retreat, or a convention center in the inner city. Whatever the setting, God created it, and he is a God of beauty, perfection, order and timing.

We, God's stewards, are given the joy and responsibility to manage his creation. I'm sure our Lord desires us to be very sensitive to his creation and manage it well. How often we have done just the opposite. What then is the answer?

Site planning the camp is part of the answer. Planning for the present and master planning for the future is vital to the camp ministry. It takes effort for excellence in site planning just as it does for food preparation, or anything else worthwhile. So plan on an adequate budget for consultant fees, hire an experienced camp planning consultant, roll up your sleeves and go to work. The end result will be worth it.

The activities required to accomplish site planning will vary depending on many factors. Factors such as size of camp, type of camp, new or existing, year round or summer use, location, government controls, finances, etc. The lead time to accomplish these activities will vary from six months to 1½ years. The longer period would reflect the requirement of a full Environmental Impact Statement (EIS), public hearings, etc.

The following activities are basic to site and master planning in order of scheduling.

Appoint a planning committee. The camp board should appoint a committee who would give progress reports to each board meeting, and present recommendations for consideration. The board should establish a budget for consulting fees. Fees will vary, and could be as low as a few thousand or as high as $30,000+, depending on the work required. The size of the committee should be three to five members including the camp director. The committee should use others for input as required. Positive, knowledgeable, visionary, business people should be selected. The committee should meet once a month or less. Each committee member should be assigned different areas of responsibility.

Select a camp consultant planner. The planning committee should be charged with hiring a professional. Check with CCI for references. Ask for his qualifications and experience in writing, and negotiate the contract in writing.

Establish camp policies/philosophy goals. Establish basic policies, statements of purpose, and what you wish to accomplish. This is an overview of where you are presently and where you wish to be in the future. Some examples are as follows: summer use or year round; denominational use only; lease to other groups; leasing to non-Christian groups; camper age; camp capacity; wilderness setting versus convention center or snow retreat; in-house food service or not; in-house programming or not; development and maintenance policies. Staff job descriptions could also be reviewed at this time.

Establish program of activities to fulfill camp policies and goals. The camp committee could do this on their own, but I feel it is wise to work with the Consultant/Planner who can stimulate thinking and also become familiar with your needs at the same time. Programming is the most important part of the whole process because it determines your ministry and outreach.

The committee should visit other camps for ideas. Research all ideas that will attract and promote Christian camping. Brainstorm new ideas; dream big, you can do it at this stage. Write all ideas down, and group them per function. Put them in priority according to the programs you wish to follow to achieve your goals.

Basic camp functions to consider are as follows: sleeping, eating, recreation, crafts, Christian training, worship, music, drama, fellowship, administration, restrooms, maintenance, disposal, utilities, parking, auto-pedestrian-horse, etc., circulation, relaxation, senior citizen care, permanent versus camp housing, satellite camping, and so forth.

Each of the above categories will have a list of needs that may approach 100 or more that need to be considered. Certification needs to be reviewed so camp certification can be approved or renewed.

Facility/site/utility/code analysis. This is accomplished by the consultant working with the camp committee and can be done simultaneous with previous activities. A professional planner needs the following information to plan the camp site, God's creation for its highest and best use.

The planner will need a survey of the size showing location of existing property lines, dimensions, roads, lakes, streams, utilities, topography, and legal descriptions. A U.S. Geological survey map often will suffice to begin with. An aerial photograph is helpful.

The planner will analyze, with the help of committee representatives, existing facilities to determine their condition and long term use.

The planner will research city/county/state/federal zoning and codes. He will meet with local planner, building inspector, fire marshal, health officer, public works director, ecology analyst, EIS director, and others as required. He will assemble all information that will affect development of the camp site including permits required, public hearing process and dates, etc. Planner will assist in carrying through to completion all permits required for development.

Permits that are often required are conditional use permit, shoreline permit,

(continued on next page)

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flood plain permit, corps of engineers permit, forestry permit, rezone, moratorium release, fisheries permit, building permits, septic permit, etc. EIS approval, if required, is most costly and time consuming. Plan on avoiding EIS or any of the above if possible.

Your planner should work for you to help simplify and reduce government control rather than increase it. It is very important that camp and planner establish a rapport with government agencies at the beginning; you will find, for the most part, they will help you rather than hinder.

Master planning site. If activities heretofore discussed are complete, your professional planner can now design your camp to meet all the conditions. It is very important at this point to allow the planner freedom to be creative and to have the time necessary to do so. Don't rush him. The result of his effort will determine your camp's future for years to come. Master plan usually is designed for some flexibility for future program change.

The planner will provide a site plan showing all existing conditions, (a separate plan should be updated as projects are built to indicate as built status) and a 10 year plus master plan showing existing and future. He will also prepare a document, phasing the development, indicating by priority the projects to be done and anticipated date of construction. Oftentimes this is required to acquire a Conditional Use Permit (CUP). At times actual building designs are required on part or all of the future development for CUP.

There are many steps of committee approvals, review, and input during this phase. However, once the site plan is complete to the satisfaction of both planner and camp committee, the camp board needs to approve it.

Fund Raising. Now that the master plan has been designed, approved, permits issued, and phase I is designed, one more ingredient is needed—money.

Review carefully all possible methods of fund raising and borrowing potential. Your camp consultant and/or CCI can give alternate financial methods and references.

Promotion. Use colored drawings provided by the planner for promotion. Print a brochure, contact people personally, have several regional banquets and/or one large multi-regional banquet. Promotion of well thought out concepts will help you raise needed funds.

Choose an architect. Phase one project needs to be designed and/or developed. Often the consultant planner retained to prepare the site plan is also a licensed architect. If not, hire a licensed architect experienced in camp design. He should prepare drawings ready for construction of phase one, and assist in getting the necessary building permits. The architect should help you during construction as part of his service.

Choose a contractor. A contractor can be selected by (a) turn key bidding process; (b) cost plus not to exceed limit; (c) cost plus with a reliable estimate; (d) camp act as own contractor hiring a superintendent to run the job, or use a qualified person on the staff.

The latter method is possible and can save you money, but be very careful. Method (b) or (c) is most commonly used if (d) is not possible, using an experienced trustworthy contractor.

Building executive committee. This would be a subcommittee of three, selected by the camp board. Function—work as a team member with the contractor—architect. Purpose—to act on the behalf of the camp to approve contracts, bids, pay bills, etc. The committee should have a president, secretary, and treasurer.

Ground breaking. The planning process has ended, you are ready to build and excitement builds to a cresendo—ground breaking!

Construction. Allow six to twelve months for completion, depending on the size of the project and the method of construction.

Dedication (Phase I). A grand day indeed. This is a time of praise to God. However, don't stop. Remember if you are to fulfill the master plan and provide a total camping ministry, this is only the beginning.

Why? To help fulfill the Great Commission! Souls through camping! God is a God of order and beauty. His creation speaks for itself. Should we, his creation, be less? □

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II. New Building Construction

Build It Yourself

Don't let tough economic times deny camp additions

by Niel Pollack

CAMPING MAGAZINE, SEPTEMBER/OCTOBER 1983

In these tough economic times, many camp owner/directors are finding that the price of improvements, additions, and renovations at their camp sites may be more costly than their budgets will allow them to spend. At one time or another all camps must go through periods of incurring unusually high expenditures in order to remain a viable entity within the camping industry.

Some camps, due to increasing enrollments, may outgrow their existing facility, and the owner/director must then decide how to best accommodate the higher enrollment. Other camps may wish to upgrade their program by the addition of some new facility such as a pool, tennis courts, recreation hall, dining room, etc. Also, intermittent renovation of existing buildings and structures may become imperative due to deterioration from time, weather, use, and so on. Again, the owner/director must determine the nature of the improvement and/or renovation and must decide how much his or her camp can afford to spend.

Cost

These expenses may range from only hundreds of dollars to many tens of thousands depending upon the type and quality of construction required. The major question asked by any camp owner/director is, how can I build a quality structure while minimizing the cost? The factors of quality and cost create a dilemma in any purchase because in general, the higher the quality, the greater the cost. But if the cost becomes too great, does the owner/director cut back on quality, build and take the risk of overextending the camp's finances, or decide not to build at all? Obviously, all of these choices are far from ideal.

Of course, the ideal situation is to have unlimited funds to be able to construct whatever is needed with the highest of quality. But is there a way to do both and still be able to afford it, even on a limited budget? The answer is definitely yes, and the way to do it is by being your own contractor.

How can you be your own contractor, you ask? Can you hire and supervise various subcontractors such as carpenters, plumbers, and electricians, even though you have absolutely no experience in this field? Again, the answer is a definite yes. At the author's camp, camp administrators acted as the contractors for several improvements which include a 30′ by 60′ gunite swimming pool, a multipurpose building, and tennis courts, all at prices far below the lowest ones quoted by local professional contractors. The savings ranged between 35-50 percent below the quoted estimates, and yet there was no sacrifice at all on quality.

It is quite possible that we built with higher quality than a professional contractor, because in most cases the professional simply picks up the phone and hires several subcontractors to do the various jobs required. We did exactly the same thing except we were far more involved in the construction of our structures than any contractor could ever be. In fact, these experiences were so positive as to give this author the courage to act as the contractor in building his own home at a greatly reduced cost and with high quality (as verified by an architect).

In interviews with four different architects and two contractors, the main question asked of each was: can a person with little or no building experience be his or her own contractor? The response from each one was defintely yes, with only one main qualification: does that person have the time to build? They stated that if the answer is yes, and if you have the time to meet with subcontractors, make phone calls, and be at the site at critical times, then you can build it yourself by being your own contractor.

Quality

But what of quality? Can a novice contractor build a pool or building with the same quality as a professional contractor? The answer received from the interviewed architects and contractors was unexpected. The consensus was that the novice would probably build it better! The experiences of the author have corroborated this statement.

The reasoning is simple. A professional contractor is usually involved in as many jobs as he can possibly handle, for a variety of clients. His primary function is to line up and coordinate the various subcontractors that will be doing the work for each of his customers. In no way will he be able to spend the time that you will spend on your own project (you'll probably dream about it in your sleep), nor will he have the same feeling that you have regarding your own personal tastes, and he will certainly not have your knowledge of camping in general to aid him in making last-minute, on-the-spot decisions.

Another reason why camp owner/directors should be able to build successfully is that they already have a large portion of the experience that it takes to be their own contractor. This includes the ability to understand business transactions and experience in dealing with and coordinating other persons.

Of course there are risks involved, but the savings to you may be as high as 50 percent or more—a savings which may well make the risk worthwhile. One problem is that since you are the contractor, if something does not work out the way you expected, you cannot complain to anyone else. It is

up to you to get the subcontractor back to remedy anything you feel is subpar or incorrect. But on the positive side, the fact that you have lived with the project to the point that it becomes a part of you means that you should be able to catch any defect almost immediately, and you will be there to see that it is corrected. Also—and of great importance—since you are hiring each subcontractor, you control the purse strings, which is the major force in getting any subcontractor to perform with the expected quality.

But again, the money that you save by being your own contractor may be worth the risks and time involved. After all, if you cannot afford to build what you need for your camp, you may be taking the biggest risk of all, which is to jeopardize the existence of your camp. All business is risky, but some risks are worth taking over others. Contracting is something owner/directors should decide upon only after carefully weighing the pros and cons and after a careful assessment of the individual needs of their own camp.

You may be wondering at this point whether or not you can hire subcontractors for the same numbers as can a professional contractor. Will you be paying "retail" prices and therefore not realize the kind of savings that you hoped for? Subcontractors are always looking to take on new work. As a rule they do not ask for your qualifications as a contractor. They are concerned primarily with the type of work required of them, the time involved, and ultimately the price agreed upon. Subcontractors want your business which, depending upon the project, may be quite substantial. If you do not believe that the price is right, that subcontractor will not get your business.

You will know what the "right" price is by receiving at least three different quotes for the same job. If a sub (as subcontractors are commonly referred to) is quite busy at the time, he may quote an inflated price. On the other hand, if your job fits nicely into his schedule or if business is slow, he may quote a very good price, possibly even lower than he might have charged a professional contractor. A lot depends upon your business prowess and on how good you are at bargaining.

How to find subs

How does one find subs? You might try the Yellow Pages, but very often the sheer numbers of listed subs are staggering. Your best bet is to ask everyone you come in contact with for a recommendation. You will be surprised about how many people know someone they are willing to recommend. In general, no one wants to recommend someone incompetent or overpriced. You may have a friend or relative in some line of construction, or you may know someone who has just had something built for himself. You might also ask at a local lumber supply (since they are always dealing with subs) to recommend a few to you. Once you get started, each person you deal with will be willing to recommend someone else for another part of your job. If your job requires an architect, he or she will also be able to give you the names of subs.

One very real problem in being your own contractor is the choreography of the subs. You have to know not only the order that the subs come in, but also which ones may have to do part of their job and then come back after someone else completes a different phase of the project. A mistake in the coordination of subs can be costly. You do not want to rip down sheet rock because you forgot to insulate the walls! This is an extreme example of the kind of thing that should never occur and will not as long as you are willing to ask questions of each sub. In general, the subs will let you know where their job fits in relation to the jobs of the other subs.

Before you make your decision to act as your own contractor, you might want to read further on the subject. Two relatively recent articles on the subject of being your own contractor are listed at the end of this article. You can also try the local library for books that might give you further insight into this subject. The two articles cited deal largely with those things that owner/directors should already be highly experienced at, such as business acumen, ability to deal and negotiate with people, coordination of others, etc.

In summary, owner/directors of camps have what it takes to get the job accomplished with high quality and reduced cost. They are business people, highly educated, and willing to put forth great amounts of effort in finding ways to enhance their camp operation. The combined efforts of these camp owner/directors result in the spinoff benefit of enhancing the name of the camping industry in general. If you have the time to act as your own contractor, you may be able to construct the improvement needed for your camp with both high quality and affordability.□

References

"Does it Pay to be Your Own Contractor?" *Better Homes and Gardens*. May, 1982.

"On the Advantages and Pitfalls of Being Your Own Contractor," *New York Times*. October 22, 1981.

After all, if you cannot afford to build what you need for your camp, you may be taking the biggest risk of all, which is to jeopardize the existence of your camp.

Five Building Alternatives

Tents, Domes, Quick Cabins, Pole Buildings, Cedar Buildings

JOURNAL OF CHRISTIAN CAMPING, JULY/AUGUST 1979

1 Tents

Platform tents can offer an attractive alternative to camps wanting to avoid the construction and maintenance costs of permanent buildings. Such camps might operate only in the summer, or if year round, they might need far more housing in the summer than any other time of the year. Or again, a camp may simply like the rustic atmosphere tents create.

"Most camps use platform tents because of the atmosphere," says Louis Brown, vice president of Anchor Industries (1100 Burch Dr., Evansville, Ind. 47711). "Kids come to camp from homes with luxuries and want to rough it more in a tent."

Camps using tents for their summer housing generally go with the platform tent, he added.

"When you compare a platform tent with a standard pole tent you see the advantages of having the wood floor to set cots and packs on," says Thomas Reinhart, sales manager of Armbruster Manufacturing (8600 Old Route 66 South, Springfield, Ill. 62707). "Additionally, since you tie the tent ropes to the side rails on the platform you don't have to extend your ropes and stakes into the area around the tent.

Both men say the most popular tent among camps is the 14-foot by 16-foot size made from the traditional khaki-colored canvas.

Reinhart says some camps use tents made from bull twill fabrics because they come in several different colors and allow the camps to color code the tents for particular use.

Camps use platform tents for camper housing, staff housing, infirmaries and storage, among other uses, Brown notes.

The platforms for the tents are built by the camps from 2-inch by 6-inch and 2-inch by 8-inch lumber, Brown continued.

He said a camp can expect a life of four to seven years from a platform tent. "Almost all camps," Brown added, "stretch a dining fly over each of their tents to extend the life of the tent and to keep the tent cooler during hot weather."

Prices for the tents range from $315 to $500, depending on the size, fabric and color, Reinhart said. — BK

2 Domes

The geodesic dome — a cabin or dining hall or gymnasium in the round — gives its greatest advantages in the areas of versatility in using floor space, structural strength, heating and cooling costs and, perhaps, ease of construction by the do-it-yourselfer, according to industry representatives.

Simply speaking, a geodesic dome is a series of interconnecting triangles shaped into a sphere. Depending on which advocate you talk to, you hear only slight variations in the following claims comparing domes to conventional buildings of equal floor space:

- original construction requires 20-30 percent less lumber;
- exterior surface areas are 25-30 percent less meaning you have that much less area to lose heat through in the winter and gain heat through in the summer;
- heating and cooling costs are 30-60 percent less because of the smaller surface areas and because the smooth,"cornerless" interior allows the free circulation of "conditioned" air;
- the interconnected triangles create the strongest structure known to any building industry — the structure evenly distributes such pressures as snow and wind loads.
- the absence of load bearing interior walls gives great flexibility and reduced costs in designing and remodeling floor space uses.

Apparent differences of opinion arise in the area of do-it-yourself dome building form kits. Manufacturers offer kits in various forms, from the the frame only to the complete structure — these they retail to the owner-builder. Generally speaking, these companies say the average person with little or no building experience can assemble the kits. Other manufacturers and builders say dome building is too complicated for the kit buyer without prior construction experience. These companies generally sell their products to experienced builders only.

A middle-of-the-roader, Anne Smith of Smith Productions Ltd., offers this insight. "You need only basic hand tools to assemble the kit frame, but you also need moveable scaffolding. You also have to remember that kit manufacturers aren't perfect so if they accidentally mark a "B" strut as a "D" strut you have to watch for those kind of mistakes. If someone wants to build their own dome we at least like to have a supervisor there while the frame is going up."

If considering a dome kit, first consider:

- the tools needed;
- the skills needed (can you really cut plywood and drywall in triangle shapes or does the kit come with pre-cut interior walls and exterior siding?);
- the readability of the directions

(ask to see an instruction book first);

- the clarity of markings on the different components (you don't want to mix up the various struts).

SIZES AND CONFIGURATIONS

Dome buildings come in sizes varying from a small 14-foot diameter fiberglass structure "especially suitable for campgrounds" (see accompanying article) to 232 foot spans made from aluminum meant for gymnasiums, recreation centers, pool covers and so on. The majority of domes fall in the range of 25-50 feet in diameter with square footage varying from 500-2500 square feet split up between one, two and three levels. Heights range from 13-35 feet. Finished prices: $10,000-$100,000 and up.

You can mix and match domes to fit your various needs. For instance you can use a single large dome alone for an auditorium or dining hall or you could connect a chain of smaller domes for meeting rooms or cabin clusters.

Since domes are relatively new on the market as far as respectability goes, you definitely should check with local building codes and local bankers before preceding too far. Most of the manufacturers can help you in these areas.

Though thousands of years old, domes were adapted to technical society by F. Buckminster Fuller in 1954. The counter-culture of the 1960's discovered domes in their most basic form — a simple, small frame covered with canvas or animal skins. This gave domes a negative image, according to some of today's manufacturers. The past five years has seen a rapid increase in interest in more permanent domes, spurned basically by a search for energy efficient, ecological sound housing, say representatives of the industry. The National Association of Dome Home Manufacturers say building codes, financial institutions and government housing authorities are beginning to recognize the validity of dome structures.

From an aesthic viewpoint, the curved shape of a dome fits nicely in almost any type of surrounding terrain, the industry claims.

3 Quick cabins

Economy-priced "quick-cabins" could solve some of the most pressing housing and storage problems at your camp. These cabins come in kit form, ready to assemble by novice builders and persons with no building skills at all, according to the manufacturers. You can use "quick cabins" for such diverse functions as additional staff housing, craft shop, camp store and storage for program and maintenance equipment.

Two examples of these cabins come from manufacturers in Michigan and New Hampshire. Both ship their products nationwide. One unit, the Carry-Cabin by Caberen Co. (550 West Western Ave., Muskegon, Mich. 49440) offers complete portability. Caberen says two people can assemble a Carry-Cabin in one hour without special skills or tools. Two cabins by Shelter-Kit Inc Camping Department (Franklin Mills, Franklin, N.H. 03235) are aimed at amatuer builders, two of which can assemble the small structures in a week or less.

CARRY-CABIN

"Our Carry-Cabin offers great flexibility in its possible uses," says Joan Bergman, Caberen vice president. "Perhaps one of its best uses is for staff housing."

Completely portable, the Carry-Cabin consists of foam-filled acrylic (ABS) panels for roof and walls jointed with PVC connectors that slip into grooves at the ends of each panel. Briefly, you assemble the Carry-Cabin by putting the floor covering on level ground and laying around the floor's edges a series of "ground channels" to accept the walls. With the wall panels set in these channels you join the panels together with the PVC connectors. You add the roof in a similar way with panels and connectors, but with the addition of several finger-tightened bolts and "wing nuts". You then snap the floor edge to the inside walls for water-proofing and secure the cabin to the ground with one of two anchoring systems. Caberen says two people can assemble the cabin on level ground with only a ladder or step stool to use in attaching the roof panels and a hammer to drive the anchors or stakes.

Vice president Bergman says the Carry-Cabin is not designed for permanent use and recommends against leaving it up for an entire winter. If used in snow areas, the cabin will hold a temporary snow load up to 12 inches, but snow should not be allowed to accumulate, she adds.

She also says in organized camping the cabin should be used by staff members or adults and not young campers who might give it greater physical abuse.

"It's ideal for use in a fragile environment where you would want to not overuse one area, but move your housing to different areas each season," she says.

When not in use, the Carry Cabin will store in an area approximately 7 feet 3 inches long by 3 feet 3 inches high by 27 to 44 wide depending on the size of the cabin and the number of panels.

Approximate sizes of the cabins range from 130 square feet to 220 square feet. Floor plans come with one, two and three rooms. Prices range from $2,295 to $3, 825 plus shipping.

SHELTER KITS

In its two cabins—the Unit One and the Lofthouse—Shelter Kit assumes "the owner-builder knows nothing about building," says Andy Prokosch, president. Each building has been designed from the beginning to be easily assembled by amatuer builders."

The design of both kits uses post and beam framing so no walls bear any loads, says Prokosch. "This means they are very easy to expand. Doors and windows can be located in any wall without weakening the structure. It is possible to begin with a very small building and expand it as time and finances permit."

The Unit One, for instance, offers a 12 foot by 12 foot design with a rearward sloping roof and sliding glass door as access. By itself this building has been used as a cabana on the beach or at the pool, a storage building, a carpenter's tool shop and trail-side shelter among other uses. But by adding other Unit Ones to the original structure you could expand it to a three-bedroom house with kitchen, dining area, living room, screened in porch and so on, all using the basic Unit One design.

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The Lofthouse—a two story module—offers the same sort of expandability.

The Shelter Kit housing comes with pre-cut and pre-drilled frames, plus siding, roofing and flooring. The owner supplies the interior finishing materials. In the case of the Unite One, shelter Kit even includes all of the hand tools needed to build the cabin (wrenches, screw drivers, hammers, step ladders, gloves, paint brushes and so on), says Prokosch.

Prices for the Unit-One series start at $2,682; the Lofthouse begins at under $5,000. Both prices exclude shipping.

4 Pole buildings

Clear-span buildings, or pole buildings, were once limited in use to such industrial applications as factories and warehouses. Today, pole buildings enjoy wider acceptance because of innate characteristics of the structures themselves as well as advantages in the industry as a whole, say Bill South for Umbaugh Pole Building Co., Ravenna, Ohio.

Pole buildings, South says, "are very economical and exceptionally strong. They can be erected rapidly in any kind of weather and since they're made from wood they're versatile so you get a wide choice of spans and a large variety of appearances."

The pole building industry as a whole hires its workers on a bonus-incentive basis, he adds, which tends to speed up work and give further economies to customers.

As the name implies, pole buildings consist of a series of poles set several feet into the ground around the perimeter of a building. The poles — usually 4-inch by 6-inch or 6-inch by 6-inch in size — stand as tall as the lower edge of the building's roof and act as both the foundation of the building and its load bearing super structure. The square poles are connected together by other heavy timbers to support the roof and the walls.

One of the pole buildings' first economies lies in its lack of a poured foundation, South notes. "You don't have to dig and form trenches, then pour the concrete and wait three days for it to cure, if the weather's right. You can augur the holes, pour in a concrete pad and set the pole the next day. And you can do this in soft soil or frozen soil so you can build a pole building any time of the year."

Once started, pole buildings go up fast, he continues. "We can build a $10,000 building in three days with four men," he says.

With the weight of the structure resting on the poles, pole buildings offer a lot of variety in designing the span of the structure and the placement of doors and windows, South says. "You don't have to worry about weakening a load-bearing wall if you want to add windows or doors and a contractor can make pole buildings as wide as anyone would want them."

South also noted the flexible strength innate to pole buildings. "A wood building can flex six inches and return to its original position without doing a damage," he claimed. "You can especially see this in geographic areas where they have hurricanes and tornadoes. Pole buildings are usually the last to go if they go at all."

Other advantages South noted for pole buildings include:

- generally lower fire insurance rates since the heavy timbers burn slowly, delaying and perhaps preventing a total collapse of the buildings;
- the use of wood, a 90 percent renewable resource, generally unaffected by strikes;
- the absence of long waiting periods from the time you order a building until the time it's completed.

South said you can use pole buildings for any type of structure, from cabins to barns to chapels to single family residences to maintenance and storage buildings.

5 Cedar buildings

As a construction material, western red cedar offers a number of advantages natural to the wood itself. Several national companies manufacture and market pre-cut buildings made from this naturally durable wood. They offer standard designs, though some will modify these plans or build from totally custom ideas.

The advantages most often cited by these suppliers of cedar buildings include:

- its insulating qualities—thousands of tiny air pockets natural to western red cedar greatly reduce the transfer of heat from warm to cool area making heating and cooling easier and less costly. Reducing the moisture content of the wood through kiln drying greatly increases this quality.
- its resistance to attacks from insects.
- its ability to withstand rot-producing fungi and insects.
- its resistance to fire.
- its dimensional stability if kiln dried, meaning it will not shrink and warp leaving air gaps in the building.
- its ready acceptance of stains and paints.
- its natural beauty if left unfinished and allowed to weather to a silver hue.

"Western red cedar is not the cheapest construction material available," says Herbert Faber, president of Cedar Forest Products Co. (Polo, Ill. 61064), "It's a quality approach. But it pays off in very long life with low maintenance and a beauty that blends with your outdoor surroundings."

Individual manufacturers use different construction methods.

Lindal Cedar Homes (Box 24426, Seattle, Wash. 98124), uses conventional stud walls and works exclusively on a contracting basis through its distributors.
buildings.

"With nominal skills and basic tools, camp employees and volunteers can construct many of our buildings," said Faber. "It's a simple type of construction. We do supervise some jobs and do the total construction on others."

Cedar buildings are used for numerous functions such as cabins, dining halls, recreation centers, shower buildings, infirmaries, administration buildings and maintenance buildings, Faber noted.

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Before and After the Architect Comes

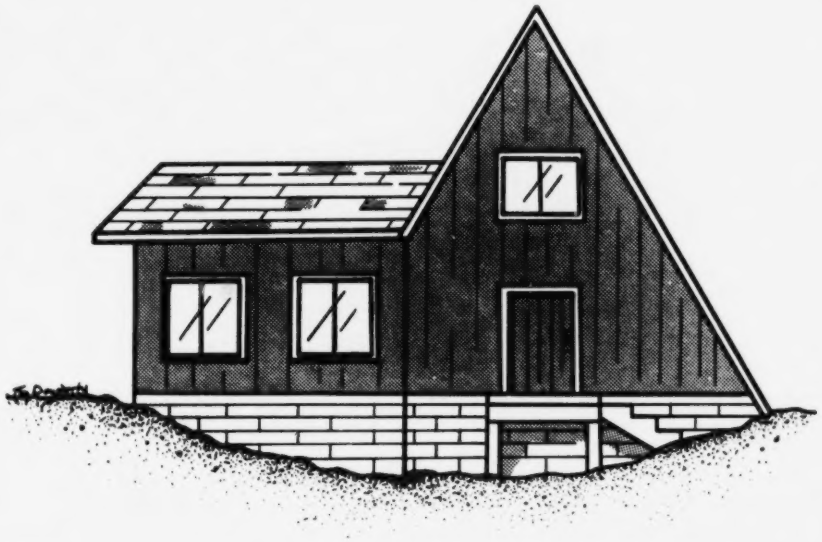
by Russell Hogrefe

CAMPING MAGAZINE, MARCH 1986

After listening to numerous complaints about poor camp buildings during hundreds of camp visits, it becomes apparent as to what went wrong. In almost all cases the camp did little, if any, preliminary planning before sketches and building plans were drawn.

The famous architect, Louis Sullivan, said, "form ever follows function," or the form must follow the function. That concept is somewhat obscure until people have a chance to practice the basic exercise of defining the function of a given facility.

There are two essential parts to this process: the first is when, how, and who will use it; the second it how it can be made most useful in the light of such use.



Poor buildings invariably have little involvement in their planning by those who will have most use of them. The planning of facilities should not be left completely to or necessarily started with architects or camp consultants. If they are good at their profession, they will have to ask the same questions the camp needs to ask of itself before getting involved in sketches and drawings. In most cases not enough time is available or affordable once profesional planners get involved. As a rule of thumb, six months should be set aside for staff and laymen to hash out where a facility is to be located and how it will be used. If the definition of the function of a facility is not allowed to ferment, then mistakes from hasty decisions will start appearing shortly after the building is completed.

The thought process of how a building is to be used should be compiled in a form so that an architect can quickly draw a basic sketch of the building. A good, detailed description of what a facility is to do will practically convert to a building drawing by itself.

Questions on what a facility is to accomplish must involve persons who know most about its potential use. These are most often not those characteristically involved in decision-making involving capital expenditures. Program staff, maintenance personnel, and those who promote the use of the camp are a rich source of ideas for how a building will be used and how to make it useful. The traditional decision makers such as executives and key volunteers, particularly those involved with budgets, are more likely to have finances intruding into their idea of what should be built. The cost of constructing a facility should not be involved in designing it until a thorough analysis of what its function is to be has been completely set out.

To start off the process, small groups of leaders of potential users or individuals who will most frequently use or work in the building should start their review with a list of questions which will enlist the function of the facility. The person who is going to assemble the ideas for the function of a building needs to budget some time for brainstorming. They also need to stimulate some creative thought as to future uses of the facility. Many national organizations which originally served only one sex now serve both. Senior citizens, pre-schoolers, and handicapped persons are also being served by organizations who did not provide for them earlier. If the chances for new uses of a building are substantial, it would be tremendously less costly to include facilities for such use in the plan and initial construction than to add them later.

The persons responsible for maintenance may not be good group members for brainstorming sessions but they have probably spent more time than anyone else bemoaning the work they have had to do to clean or repair a facility. One cannot assume all of these maintenance concerns have been heard and exclude maintenance people from the planning process. These staff members can be helpful. Begin by asking them, "What bugs you most about cleaning and/or repairing our buildings?" or, "What kinds of problems do our campers most frequently create for you?" ("Broken screens" will

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most often be heard as the first response. At our camp we made a rule that no screen was to be replaced without adding one-quarter-inch mesh hardware cloth. It did cost more in materials but cut replacements by more than half. This saved on labor and a more intangible benefit—a less frustrated maintenance person.)

A relaxed setting

Enlisting responses from some individuals, like all good conversation, requires time and a relaxed setting to get the most knowledge from certain people, particularly those who are not "pushy" in group settings.

Questions such as the following can get the brainstorming process started:

Where will the building be located and why there? Accessibility is one consideration but facilities which require water and sewerage and utilities such as gas, electricity, and telephone also need to be considered. The rationale for location should meet the criteria of making the most sense of all of the options developed.

Who is going to use the facility—children, boys, girls, adults or senior citizens of both sexes and how many at any one time? This question should not be answered with just the current camp population as the criteria. Is there a possibility that five or ten years later it will be needed for people not now using it, such as those who are handicapped? If the property should eventually be sold, will the facility be so limited in design that it would have little value except to a similar group of users? If the camp now serves only one sex, is there a chance that will change in the future? Children may now be the only ones served; but if adults were to be served, would the facility lend itself to more privacy preferred by that age group? Sleeping space which is adequate by using double deck bunks may be fine for children but inappropriate for senior citizens.

When will this facility be used? It is getting less practical and cost efficient to use camps for only one season of the year. The ongoing annual costs eat into the single season budget in larger and larger portions and year around use helps spread out such costs. If a building is to be used for more than one season, defining those who may want to use it in "off season" becomes a critical part of the exercise of defining its function. Winterizing and energy conservation are, of course, major factors to be considered. School camping or outdoor education programs are one source of non-summer use of facilities. Other people who are available during week days, such as senior citizens and certain groups of handicapped persons, are also possibilities. If such special use is contemplated or desired, the functions needed to serve them must also be defined.

Winterizing and energy conservation are major factors to be considered.

If buildings are to be used year around, what needs to be done to make them summer buildings in the summer and winter buildings in the winter and the temptation to stay indoors when everybody and most activity should be out-of-doors needs to be considered when specifying the functions of a year around building. If one wants it really open to the out-of-doors in summer, this has implications for its design.

The orientation or the way a building is to face is an important consideration. The most obvious function is answered in the following question: Who needs to most frequently have access to which parts of this facility? Campers need to have doors most accessible to them which lead directly into the dining hall or activity rooms. Kitchen and service areas require access to roads, preferably ones that do not intersect heavily traveled paths to the dining room or program areas. The situation may be such that a creative compromise on the way a facility faces needs to be achieved. One would not want the kitchen and walk-in refrigerators oriented so that they had the prime view overlooking a lake. A number of options can be developed and the best of these, all factors considered, becomes the decision on which way the facility will face.

Another concern about design is something called child proofing. Very often in lawsuits the expression "attractive nuisance" is used. Facilities and their surroundings often qualify for such a designation. The nice blank wall that invites writing or, worse, one that can hardly be cleaned if marked up is one such example. Others include the path or road with just the right size stones for throwing. Fire extinguishers which are just hung on a wall exposed certainly qualify as an attractive nuisance. Placing them in a box with a glass that must be broken serves as a deterrent to horseplay.

Paths and roads to a facility also need to be considered in planning. One would not plan access to a facility to be the longest way around. There is an old saying, "don't build any paths until one sees where people will walk in the natural course of going to a facility." One way to do this in the northern part of the country is to wait one winter using temporary paths to see where the trails in the snow will be made.

The materials used in paths and roads is another factor to consider. Black top and cement tend to destroy a natural image. In addition to gravel and crushed stone for roads and wood chips for paths, there is ground up limestone slag from steel mills which makes excellent roads and paths. This is a very porous stone which dries up wet spots and makes a solid foundation. Because it is "burned" limestone, its grey color blends in with natural surroundings and preserves the natural image.

It is important to understand personal concerns and priorities of architects and planners. They, for the most part, are a conscientious group with the needs of their clients foremost in their practice. To continue to be successful, they obviously need to satisfy those who hire them. On the other hand, the less planning and defining of function by those who will use and maintain facilities and the more discretion that is delegated to others, the less likely a truly functional facility will emerge.

What is uniqueness?

Professionals who plan buildings are not mind readers, and their perception of specific use to which a building is to be put, now and in the future, is limited to their past experience and what one tells them. In even the best of architects there is always a little

piece of hidden agenda which says "my professional standing would be enhanced by a truly unique design." "Special arrangements" such as the less they get paid compared to their regular fees, the stronger the temptation to make their mark in the architectural world with your money. (We have a building with a nonfunctional coupalo with scuppers which look like a roost for eagles to prove my point. The worst of this was when the person who contributed the money for the building asked, "and what is that thing?" We did fight off with considerable effort the diamond shaped windows in some garage doors.)

What is unique design? A building which has a single roof line may be perfectly functional but hardly a unique design. On the other hand, three or four right angle roof lines or ones at different elevations become a little more stylish. Most of the leaking roofs which we have encountered can be credited to this kind of construction. Even more stylish are flat roofs, quonset hut shapes, and parabolic types which certainly look unique but hardly qualify as maintenance free. The classic example of unique design is a camp swimming pool facility with a bridge like roof structure with no covering at all.

This brings us to who to hire once the camp knows what functions it wants served by a given facility. The more cozy the relationship between designer and camp, and/or the more concessions on fee, the less likely a truly good facility will emerge. Board members as agency architects for free or for fee are undoubtedly the worst scenario. What is involved here is the loss of control and discretion to insist that the structure fits the function. The proper assignment of roles is that the architect is to serve the camp and provide a design which meets most if not all of the functional definition as established by future users of the facility.

The design should be cost efficient and relate entirely to its function. It should, of course, meet the required building codes and anticipate as best it can likely changes in those codes. It should also err on the side of safety, such as electrical service and circuit breaker boxes which prevent tampering, and fire extinguishers that are not empty when most needed. The architect will also establish construction specifications, coach or conduct the bidding process, and monitor and be the legal custodian of the construction work. The greater the distance the architect must travel to supervise construction, the less likely the facility will get the supervision required. At critical construction points a building may require daily visits.

Once the point is reached where plans are drawn, it is critical that they not be treated as though they were perfect. Even the best of plans have a number of bugs in them, and inexperience in reading blueprints should not deter one from studying them. Anyone can quickly learn to read things like the swing of doors, location of light switches, electrical outlets, and the like. Encourage everyone to look at the plans including maintenance people; and invite questions and comments. Separate out that which is pure design for design sake and decide whether its contribution to the ambience of the building justifies the expense. Switches need to be beside the door on its open side, and if there is more than one entrance, a switch for the same light should be near that other door. Fire extinguishers need to be located near exits so a person does not have to run back into a fire to get one. Toilet booths need to be big enough so a person may close the door which traditionally swings in. Colors as well as wall and floor finishes all have implications for use and maintenance. If floors must be mopped, access to water and disposal of mop water needs to be considered. If a room is to serve several functions, storage space for different furnishings needs to be considered. If buildings are likely to be open but unoccupied when it rains, the size of eves and the way window open needs to be thought about.

Elevations, or the height of things, are a little more difficult to visualize. Buildings should be far enough out of the ground and surroundings graded so that water does not run in or stand around a building. Construction into a hillside needs to have an adequate high side foundation and waterproofing to cope with heavy rains and/or melting snow. One is almost tempted to say the less stairs the better, but that may not always be practical. Small children and older adults have problems with stairs, and they serve as barriers to the physically handicapped.

Encourage everyone to look at the plans, including maintenance people and invite questions and comments. Separate what is pure design for design sake and decide whether its contribution justifies the expense.

Windows which are too high or too low both pose problems. High windows provide privacy, sometimes without drapes, but reduce casual outside supervision; and occupants cannot always readily see the out-of-doors or get out through them in an emergency. Low windows affect privacy, and if in the way of beds and/or chairs, they limit room arrangement and are more easily broken. Ventilation and making the most of air movement is a consideration particularly in buildings which are not air conditioned.

Conserve on extras

Every change in the plans which one finds or adds as a result of looking at the plans before the contractor bids the job should save more than half of what it would cost later as a so-called extra. Some contractors anticipate and make a lot of their profits on extras. An electrical switch or outlet installed after the walls are closed in will cost many times its inclusion in the plan and installation during the normal sequence of construction.

One cannot usually sense distances on a blueprint; a ruler which converts feet to fractions of an inch is an inexpensive and useful tool. It will only take a few minutes to find the scale on the blueprint and on the ruler made for that purpose. In no time at all, one will be able to tell that the door will not swing all the way open

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with the six double deck bunks planned for that location. The electrical outlet which was to be used for the movie projector is so far away that it will always require an extension cord; and that cord will run right across a traffic pattern created when people are filing into the room. It was thought the projector screen would be located in one spot; it now appears people entering will be coming in the door located near it. Late comers will distract a showing in progress and make that big shadow as they walk in front of the projector on the way to one of the few seats still available. It might be best if the outlet were in the center of the floor and the architect should be able to arrange that.

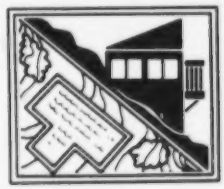
Go back to the questions and ideas about the use of the facility and the people who will use it. Some obvious considerations will pop up. Children are generally shorter than adults, and people in wheel chairs are shorter than adults standing up; can they or should they be able to reach switches, shower handles, fire alarms, extinguishers, and window controls, particularly where windows might serve as an emergency exit?

The functional ideas in response to all of the other questions raised during planning can now serve as an outline against which to match the facilities, as they appear on the blueprint, against the expectations established for their use. All of those ideas about making space more functional can be achieved by making sure they are incorporated in the blueprint by rereviewing the use to which each space will be put.

Two remaining details should be mentioned. One is the schematics and operating manuals which come with mechanical equipment. The architect and the contractor need to know the mechanical installation will not be paid for until these papers are delivered. Some mechanics keep those items and the camp becomes dependent on the installer when repairs are needed.

The second detail has to do with what are called "as built" plans. Almost every building requires some changes in the course of construction. Part of the arrangement with the architect should be that they supply a final set of plans which include all of the changes or as the term indicates as finally built. Without such plans the changes, hidden in walls and lost to memory or change of personnel, may come back to haunt someone who will later pay dearly for what could have been a simple and inexpensive procedure at the close of construction.□

When Do You Need A consultant?



C. June Stump

JOURNAL OF CHRISTIAN CAMPING, JANUARY/FEBRUARY 1981

This is a difficult question because experience, expertise and discernment vary so much from camp to camp. Traditionally, camps were small, summer operations. Some did quite well as they prayed for guidance and went ahead with the skills available. Even so, almost without exception, camp boards and directors are struggling with problems that had their beginning years ago. These seem to increase as our operations have become more complex. And now we are making decisions which will affect the future operation and impact of our camp's ministry.

Consultants are now available with expertise in many areas. Some also have a practical understanding of Christian ministry—which often utilizes volunteers—and camping in particular, with a desire (sometimes, even a calling) to serve the Lord to further His cause in this way.

When is such an objective, competent person needed? A general "rule of thumb" could be when projects or changes with long range implications are being considered and especially if there are varying opinions regarding them.

Some camps call a specialist in just to make sure they are considering all they should or to confirm that they are making the right decision.

Some situations calling for a consultant would be:

Land acquisition or disposal

Sometimes adjacent land becomes available or is being considered for purchase. The impact on and relationship to the existing site and program needs assessment, as well as suitability for the use(s) envisioned for it.

Occasionally, established sites become obsolete or impractical for various reasons, yet not everyone is convinced that this is so or, what to do next and when.

A new site (developed or undeveloped) may be under consideration. One property appeared fine until the soil analysis was secured revealing severe limitations for septic systems. Finding another site was much less expensive than developing one with such a handicap to overcome.

Replacing or renovating major facilities

Usually the need for a new facility such as a dining hall, addition of a swimming pool or year-round lodge, etc., calls for reviewing various locations in relation to current and projected program needs. Building on the old site may not be the best place.

Many camps are considering expanding a summer operation into a year-round one. Winterizing existing buildings which are often poorly sited and not designed to conserve heating, cooling, lighting can be feasible.

Often these can be retrofitted or remodeled at less expense than a new facility would cost, providing the structure is basically sound and reasonably well located for intended use. Improvements can be made in a logical step by step process with little interruption in use, a major fund raising drive, or great indebtedness.

Energy efficiency and conservation must be a very high priority on all of our sites. We often think of building modification, adding insulation, etc., in this regard. Don't overlook the advantages of strategically placed trees, shrubs, fences, or even other structures to either encourage or prohibit air circulation, and timers to regulate thermostats and lights.

There are new devices available at reasonable cost and easily installed, which can trim at least 20 percent off your electric bill. Some also act as lightning arrestors to protect compressors and equipment from damage. There have been recent advances in energy efficient lighting too.

Have you heard of the new hybrid poplar which will grow 25 feet in just five years and after harvesting will grow six more crops from the same stump? Be sure to evaluate your own particular situation and needs, then the cost in relation to expected payback time.

Major program changes or additions

Perhaps too often we tend to limit new programs and ways of doing things to existing facilities and don't give enough thought to adapting our present facilities so they will facilitate new, needed programs.

Some new programs, such as family camping or day camping, may require new facilities or their own area or both. The relationship of these to existing programs and facilities needs careful consideration.

Some consultants will help you solve specific problems on a per diem basis. Ask other camp directors for recommendations on persons who may be helpful. Get some input and stimulation from outside your own group. However, unless you have a viable long range site plan this may be difficult to do properly.

If your camp doesn't have a current five-ten year site improvement plan, it is probably wasting time, money, and energy. "Do all things decently and in order" we are told. When the whole picture is seen, individual parts are then seen in relation to the whole. The impact of adding or changing one part will be more evident. It may not affect other parts, but it is more likely that it will.

These relationships must be understood so we don't create more problems than we solve. We need the long range view to put things in proper perspective so all will fit harmoniously into the total plan.

Obviously, the more diverse the operation, the more complex the interrelationships of program will be. Camp board members are usually volunteers, and camp administrators are often so busy with the present day to day problem solving that there is little time to stop and do the kind of planning that is necessary, even if they were qualified and felt comfortable doing it.

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A consultant can guide you through the planning process efficiently, thoroughly, and effectively making his or her expertise, experience and objectivity available to you. (It does help to have someone who doesn't know who donated what to camp!) Sure, it will take extra time but when done you will be amazed at the time and money it will save. Just ask anyone who has tried it both ways.

You'll probably be convinced that you do need a consultant to help your site become a silent witness to everyone that your God is one Who values orderliness, enjoys the beautiful, and is able to provide abundantly according to His will! □

III. Conservation of the Site

Camp Forestry

by Richard Smith

CAMPING MAGAZINE, MARCH 1978

Many camps have areas much larger than needed for their buildings, sports areas, or parking. Most of the time these areas will have nature trails, hiking trails or overnight camping sites. Regardless of the use, these areas can also contribute to the camping costs, if they have growing trees.

Every tree will be harvested, either by man or by nature. It will be impossible to keep any tree alive forever.

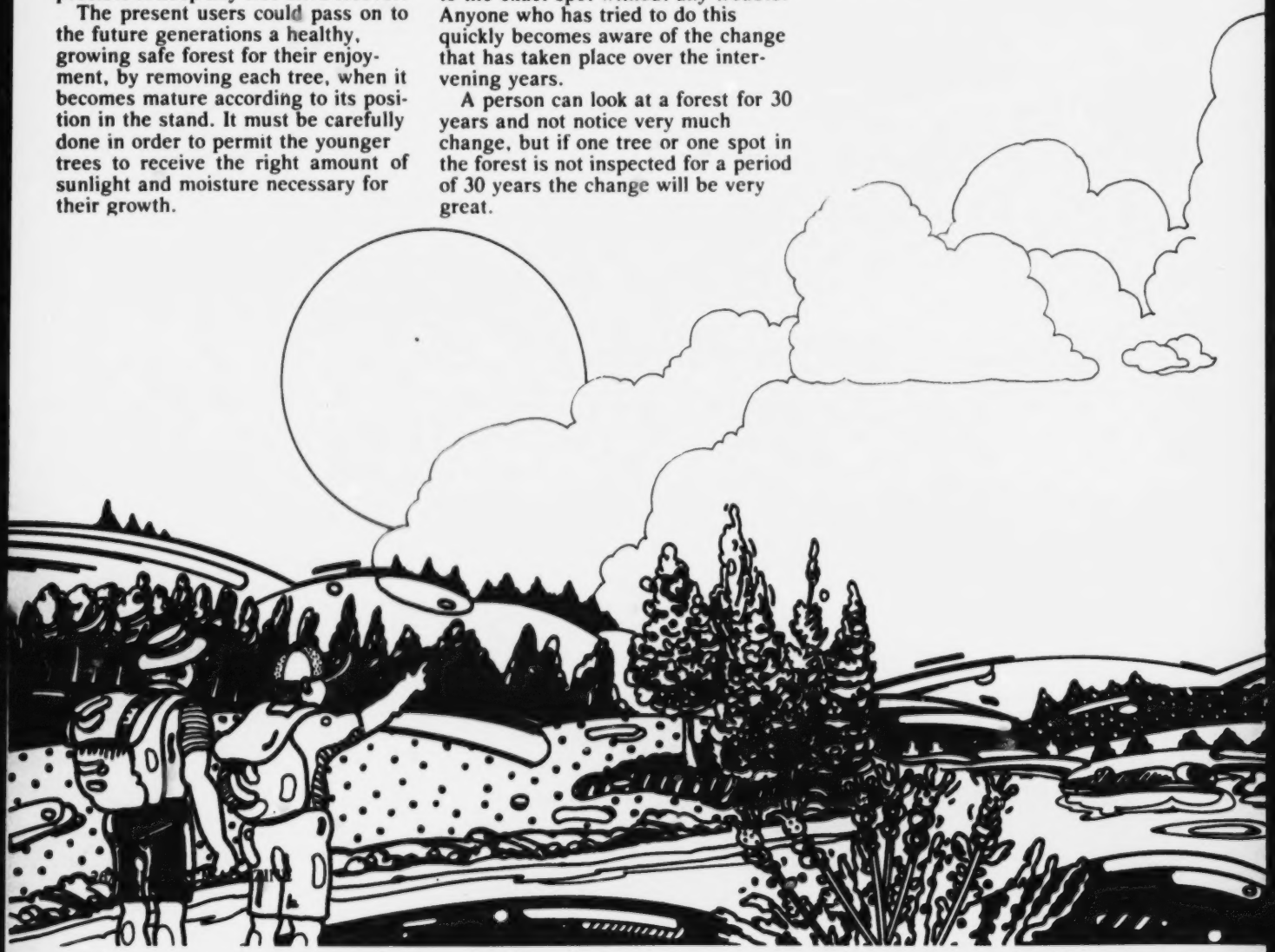
The present users could pass on to the future generations a healthy, growing safe forest for their enjoyment, by removing each tree, when it becomes mature according to its position in the stand. It must be carefully done in order to permit the younger trees to receive the right amount of sunlight and moisture necessary for their growth.

When camping is thought of, it will many times be related to trees. Almost every camper that is over 40 years old will recall with much pleasure the camping experiences they had in a particular spot or under a specific tree. If this happened when they were 10 to 12 years old, they can still clearly recall just how the area looked, and they are sure they can go to the exact spot without any trouble. Anyone who has tried to do this quickly becomes aware of the change that has taken place over the intervening years.

A person can look at a forest for 30 years and not notice very much change, but if one tree or one spot in the forest is not inspected for a period of 30 years the change will be very great.

Plant growth

So great in fact, that when I ask an old timer where a particular property corner was located and to which they said they could walk to without any trouble, they discovered they were not able to find it when we looked for it, even though it was marked by a stake or a pipe. The reason this occurs is due to plant growth.



All plants germinate, grow and die. Every plant, whether, it be a Lady Slipper, a Hazel bush or a Redwood tree will ultimately be harvested, if not by a member of the animal kingdom, then by nature. When nature harvests the plants, the fibers are broken down, the nutrients released, and the new succession of plants utilize them in their growth.

Using this system of management does not provide man or society with any physical benefits. In order to survive, man must kill for food, shelter, and clothing. Whether he kills plant or animal life, it is still a living tissue. In any camp management program, this fact of life should be recognized and, where possible, a forest (not timber) management plan should be created based on the individual tree management concept.

40 year span

The plan should be for a span of at least 40 years with the objective clearly identified, as it takes a tree 30 to 40 years to mature. If new goals or objectives are not definitely identified, then everytime a new camping director comes on the job the objectives are changed. It can create confusion and the camp forest can be destroyed. If the individual tree management concept is used the benefits of the following points will be realized.

1. Removal of only trees that are mature according to their position in the stand. Usually 10 to 10 percent of the live stems.
2. Altering the eco-system very little.
3. No slash problem.
4. No fire damage.
5. No shock, sun scald or no more than normal wind throw.
6. Harvesting of mostly mature trees. These are trees that return a profit at the mill.
7. No need to replant as the growing stock is already there, with 80 to 90 percent of the trees left to grow.
8. Logger can return every three to five years to the same acres of forest. He becomes more familiar with the terrain, soil conditions, weather and growth characteristics of the stand.
9. The owner receives a periodic income usually every three to five years from each acre. The total profits for a period of time equal to one rotation period will be substantial.
10. The genetic quality of the timber stand is improved by removing any tree that looks inferior before it is in condition to produce seed. The super trees are used as seed trees. These trees are growing larger while the new stand is becoming established.

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11. Shoot for a period of perhaps 10 to 15 years between the time the seed trees are cut and a commercial thinning is started in the new stand. The first trees to be cut will be the older, larger trees in order to release and save the younger shorter trees.

12. The public accepts this timber management system. In the last 22 years in this area we have applied this system on thousands of acres of forest lands.

One of the areas on which we have applied this system is called the "Farr Tract." Although the area has been managed for the past 22 years, permanent growth plots were established only seven years ago. When the forest management was started, there was an estimated 1,000,000 board feet of merchantable timber on the tract of 426 acres.

During the past 22 years, 3,026,861 board feet of logs have been harvested, and there is now 3,229,000 board feet of timber growing on the tract.

In 1973 the trees three inches in diameter and longer were counted on each growth plot. There were 119 trees per acre. In 1977, there were 188 trees per acre, or about a 57 percent increase during those past five years. This means there has been a satisfactory financial return to the forest owner, and there are now more trees per acre than there were at the beginning of the forest management.

The annual growth on this Douglas Fir site III land, as determined by the annual measurements, is 872 board feet per acre. A reasonable stumpage value for these young trees is $100 per 1,000 board feet of logs, in 1977.

A camp with 150 acres of timber that was located in a manner that would permit forest management, could be creating a value of 150A x 872 board feet per acre x $100 per 1,000 board feet or $13,080 per year. Experience has shown that the total amount of value grown could not be harvested each year. It would not be feasible, either from an economical point of view, biologically, or aesthetically.

Therefore, the forest management plan should be made to harvest about 77 percent of the annual growth every three to five years. This would result in the harvesting of trees whose sale would return to the camping committee about $10,000 per year, or $30,000 to $50,000 every three to five years.

This has been done on the west coast of Oregon and Washington states over the past 22 years on several thousand acres of forest lands owned by the various camping organizations. In addition to the many thousands of acres of forest lands owned by private owners, all their lands still have their forests plus a better accessability due to the timber harvest roads and skid trails.

This forest management system is not new. In parts of Europe it has been practiced for many years.

Forest's eco-system

The camps that include a forest management plan in their camp management program will have an excellent opportunity to acquaint the campers with their place in the eco-system of the forest and how to obtain the three basic needs of life (food, shelter, clothing) from this natural renewable resource without destroying the environment.

The trunk of a tree may be removed from the forest without the loss of an appreciable amount of the nutrients that were used in its growth. Research has shown that most of the nutrients taken from the soil by the tree are in the leaves, twigs, and small branches.

For this reason, when a tree is felled and the branches cut from the trunk, the branches should be left where they fall so that after a timber harvest the branches will be scattered throughout the harvest area. When the wood rotting fungi complete their job of breaking down this organic matter, the nutrients that were in the leaves, branches, and small twigs will be returned to the eco-system to be used by the remaining trees to promote their growth.

Sometimes people think these small branches should be picked up and piled and then burned. This action will destroy most of the nutrients that were removed from the soil by the tree. If the limbs are piled and left to rot, then the nutrients will be concentrated in one spot rather than scattered throughout the forest.

The use of this information in this manner points out the fact that the management of a forest using this concept is really the management of the environment with the individual tree playing only one part in the whole management program. Many people believe they can keep a forest in its present condition if they lock it up and don't allow a tree to be cut. The results of this action are the same as trying to pick up mercury with your fingers.

The only way a forest can be kept in one condition for a long period of time is by harvesting individual trees. The same environment can be maintained if the conditions are periodically changed to provide the necessary habitat for the desired plants, animals, and other living organisms.

In order to do this, the managing forester must give equal weight to both the necessity and the art in forest management. In 1907, Bernhard E. Fernow, one of the original three foresters in the United States, gave this definition of forestry:

"Forestry is an art born of necessity, as opposed to arts of convenience and of pleasure. Only when a reduction in the natural supplies of forest products under the demands of civilization necessitates a husbanding of supplies or necessitates the application of art or skill or knowledge in securing a reproduction, or when unfavorable conditions of soil or climate induced by forest destruction make themselves felt does the art of forestry make its appearance." □

Camp Conservation

A good program will consider land, water, forest, wildlife and fish in developing a master plan

by Loody Christofero

CAMPING MAGAZINE, FEBRUARY 1979

There is nothing prettier than a well-maintained, clean summer camp, fringed with trees, lush with grasses and other vegetation, and with well-tended paths and roadways. There is nothing uglier and more depressing than a camp with eroding lands, bleak, dusty vistas in every direction, and paths and roadways that become quagmires after a summer shower.

Which kind of camp you have depends on your conservation practices. Good conservation is not difficult, but like any other desirable thing, it takes planning and attention to a few simple principles.

It starts with a conservation or land-use plan. The first step is an inventory of the soil, water, forest or grass, and fish and wildlife resources on the property. Make an analysis of their present condition, potential productivity, and potential problems. The next step is development of a long-range program designed to improve the condition of the property based on how it will be used.

The 600 camps operated by the Boy Scouts of America (BSA) seek help in developing long-range conservation plans from the Soil Conservation Service, state forestry agencies, the U.S. Forest Service, the Bureau of Land Management, and conservation-oriented industries.

To begin making a conservation plan for your camp, visit the nearest office of the Soil Conservation Service and ask their help. Experts from that office will do a soil survey of your camp property without charge. The survey will cover such aspects of land-use planning as drainage, erosion problems, and where not to locate buildings. With soil samples, they will be able to advise you on how to best use various areas of your camp.

The Soil Conservation Service and other agencies previously mentioned will be very helpful in inventorying the camp's resources and suggesting best uses. In executing your conservation plan, manpower and perhaps heavy equipment will be needed. The BSA has found that sometimes these are available free from federal, state or private conservation agencies, or from industry. Whether your camp can get such free services may be a question; but ask.

Here are the guiding principles for Scout camp conservation plans:

It is desirable to keep camping properties in a wilderness or semi-wilderness state.

The entire property (not just areas set aside for conservation projects) should be an example of good conservation practices.

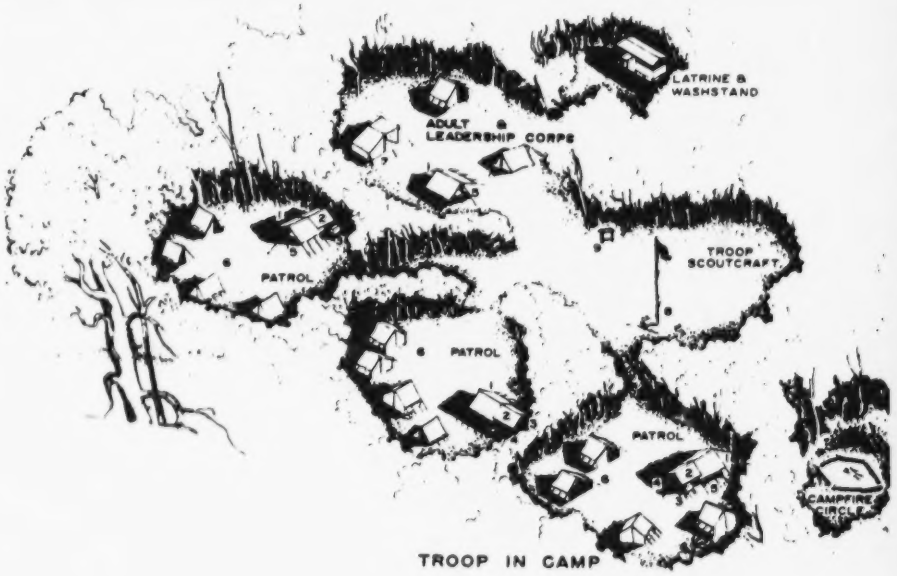
Where there is suitable water, fishing should be permitted. Get help from wildlife management experts in improving the waters.

Management of other wildlife resources should also be carried out with guidance from experts.

Spacing, location, and maintenance of living quarters for campers is an important part of the conservation plan.

On some camp properties, multiple use of land may be feasible. Timber may be harvested, for example, or grazing rights granted, if these are consistent with the conservation plan.

These guidelines for Boy Scout camp conservation may not necessarily apply totally to your camp. But the principles behind them will: (1) maintain and improve the camp property to serve present and future



TROOP IN CAMP

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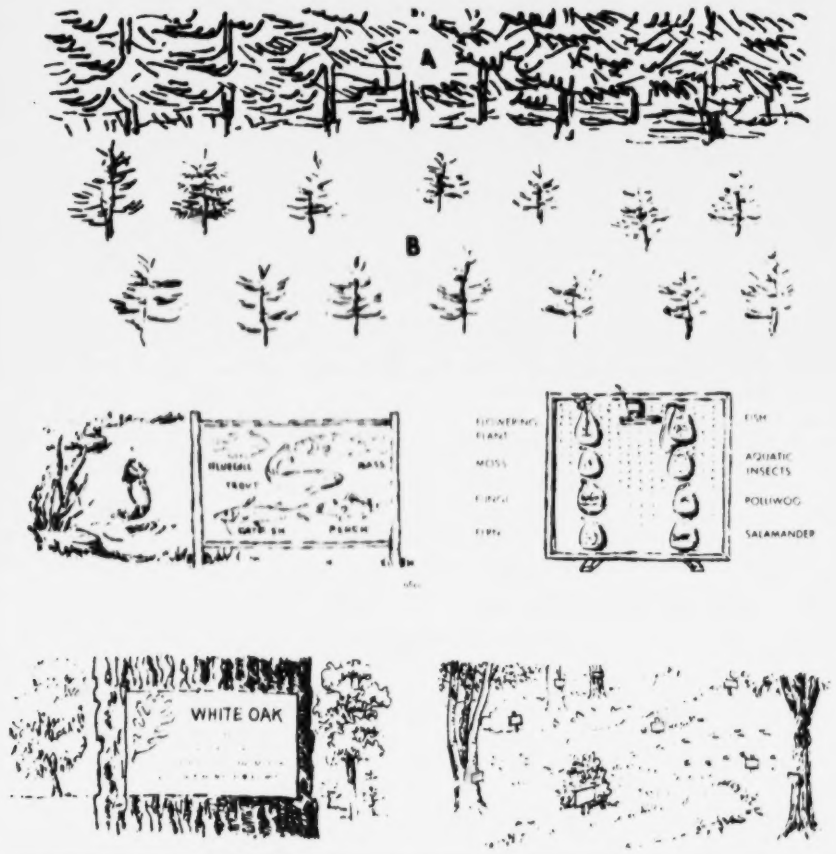


Displays like these contribute to a camper's environmental education.

needs and (2) make the most productive use of the camp's land and other resources.

Much of Scout camping is tent camping. And so in Scout camps a system of rotating campsites is used to allow the land to recover from camping periods. Each troop campsite has a total area of three to four acres, which is divided into three areas. While area A is in use by campers, area B is being prepared for the next camp period, and area C's ground cover is being restored. The three areas form a rough circle with the only permanent installations—latrine and washstand—in the center so that they adjoin all three.

In each area trees and underbrush are removed, leaving a screening fringe between areas. After it is cleared, each area is sodded with grasses or ground cover suitable for the soil and climate.

If your camp has cabins or lodges for housing, you cannot use the rotation idea. You may have a problem with ground cover and the likelihood of erosion around the buildings. Around any such permanent building in our camps, consider a ground dressing of washed gravel, wood chips, or other suitable material, primarily to control erosion. The same treatment may be used for paths that carry heavy traffic.

Summer camp is perhaps the best place to study nature and work on conservation projects; in Scout camps, conservation and ecology are high on our list of program priorities.

The traditional nature lodge or museum is not the most ideal place for an active, educational ecology-conservation program. Too often such permanent structures keep the campers indoors and are little more than a hodgepodge collection that has limited value.

Ecology-conservation trails with exhibits, displays, and live animal collections are more suitable. An ecology-conservation trail should be a living section of a typical nature community. Generally it is about a quarter-mile long.

It should show the highlights of the natural community—the most common plants; the successional stage the nature community is in; indications of past disturbances such as fire, grazing, or lumbering; effects of soil, moisture, wind, and other factors; the wildlife and how it fits into the community; and man's influences on the community's ecology.

This doesn't mean that every plant, tree, and rock is identified. But it does mean that after walking the trail, the camper knows the general story of the plant and animal community. Here are highlights of an ecology-conservation trail:

Geologic origin of the country. Label rocks and soil, tell origin and age.

Soil profile. Dig a trench to show ground cover, organic debris, soil, subsoil, and parent material.

Plant stratification. Identify most common plants, including trees.

Successional stages of dominant plants. Mark indications of whether this is climax stage, subclimax, or any other stage.

List animal associations in the community and show animal relationships, how animals depend on other animals and plants for life.

Somewhere on the trail, develop exhibits that are designed to teach certain fundamentals. Group them by purpose—model runoff plots, soil profile, fire danger warning chart, charts showing food webs and the water cycle, sections of logs, fire tools, and small animal traps.

Conservation demonstrations should be set up where they would normally be found: stream improvement devices in a stream, woodlot management projects in the woods, and erosion control devices where erosion occurs.

As part of their merit badge work, Scouts undertake their own conservation projects. Often these are done in our camps. If your camp operates a nature program, conservation should be a part of it, and perhaps your campers also may do conservation work on the camp property as a learning experience.

In Scouting, conservation is a way of life, and it's also a way of keeping camp properties as attractive and productive as they can be. All of us owe it to our campers and to our nation to practice good conservation in our camps. □

Wildlife habitat improvement

By developing resource management plans camps can become islands of hope for many wildlife species

by Elaine Rogers

CAMPING MAGAZINE, MAY 1984

Since the early days of the organized camping movement, one of the primary purposes of camps has been to bring campers in contact with the natural world—to increase their awareness of the components of our natural world and to enlighten them concerning the interrelationships of those components—all with the hope that someday their experiences at camp will help to form the basis for responsible adult decision-making.

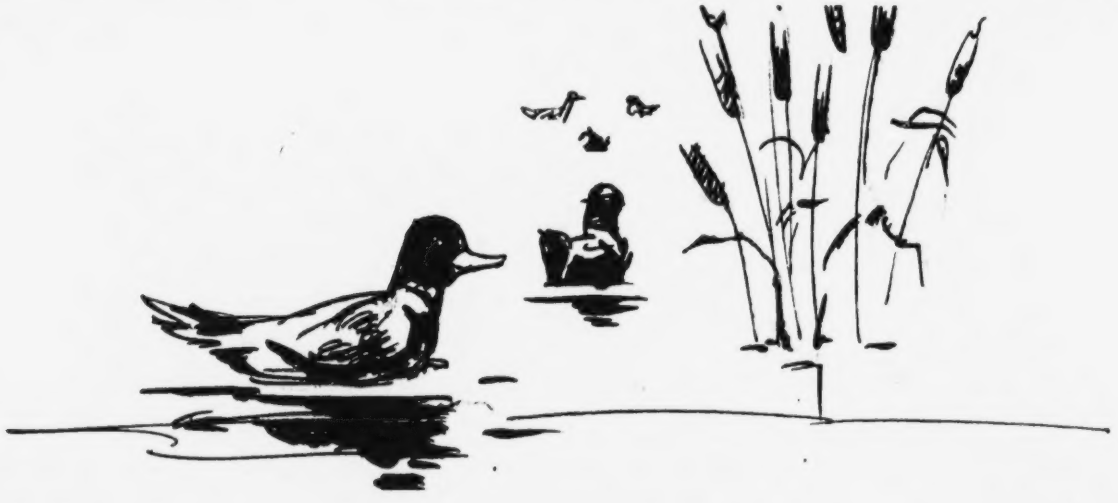
The task of educating young people about the natural world has become exceedingly more important with the increasing urbanization of our modern society. The latest U.S. Census indicates that over 80 percent of Americans live in urban areas. This statistic provides us with some indication of the enormity of the task at hand. By far, the majority of campers have seldom, if ever, climbed a tree, floated down a river, caught a frog, listened to a loon, stalked a deer, or wondered at the stars.

Dr. Rogers is an associate professor at East Stroudsburg University, East Stroudsburg, PA, in the Department of Recreation and Leisure Services Management.

Camps, then, become very special places—places for children to explore and experience their natural surroundings in a way that may not be possible in their home environs. It would seem to be an appropriate goal for camp owners and administrators to provide the best possible programs and natural resource surroundings in order to maximize these experiences for campers. The natural resource base of the camp property must be managed to provide for safe, aesthetic, and diverse direct experiences for campers. In order to accomplish this management goal effectively, the American Camping Association recommends that resource management plans be developed which address the specific resources found on camp property. One or more plans which address such areas as forest management, water management, and soil conservation management should be developed by the conscientious camp owner and administrator.

The term "habitat" refers to an animal's home—the place where an animal lives and which provides the appropriate combination of food, cover, water, and living space to meet its needs. The National Wildlife Federation, in its 1983 Environmental Quality Index, states that habitat loss is the nation's most pressing wildlife dilemma. As the U.S. population increases, requiring more living space for humans, many wildlife populations are decreasing, some to the point of extinction.

The amount of land suitable for wildlife habitat is decreasing at an astonishing rate as we build roads, shopping centers, parking lots, housing developments, and industrial complexes. Many land managing government agencies and large landowners have recognized this problem and have begun to manage their lands to provide benefits for wildlife. Collectively, the organized camps in this country comprise a substantial amount of land. There are more than 2,400 camps in the ACA in the United States, representing about one million



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acres of land. It is estimated that over 10,000 organized camps exist in the country, adding perhaps another 2-3 million acres of land.

The wildlife resources contained on these lands can and should be considered in resource management plans and actions. The camp administrator should consider the impacts of property development on the wildlife that use the camp property as their "home." By enhancing those characteristics of each property that relate to meeting the habitat needs of the wildlife found there, camps can become "islands of hope" for the continuation of many wildlife species in this country. Planned habitat improvement is necessary in order to increase the quantity and diversity of wildlife, and, thereby, to increase the opportunities for interaction with wildlife on the part of campers.

Identify wildlife

The following are steps involved in developing a wildlife habitat improvement plan for camp property.

1. *Identify existing wildlife on the camp property.* The first step in developing a wildlife habitat improvement plan is the identification of types and species of animals to be considered for management attention. Answering the question, "What do we have here?" is a prerequisite to making habitat improvements.

The types of fauna (animals) to be considered for management attention will vary depending upon the camp size, geographical location, and habitat types found on the camp property. For example, if the property has a lake or large stream, habitat improvement for fish and amphibians may be considered. The types of fish found in the lake or stream may be identified through stocking records, visual observation from the shoreline, fishing, or fish shocking. This last technique may be done only by a qualified person such as a fishery biologist from the local university or a local agent of the state fish commission.

This article will concentrate on identification techniques for two groups of animals—birds and mammals which are found on all camp properties. In order to conduct a meaningful inventory of existing wildlife, the basics of animal taxonomy must be understood. Animal taxonomy refers to the science of classifying animals by their characteristics. All animals are classified into increasingly specific groups from "class," "order," "family," and "genus" to "species," with "species" being the most specific classification grouping. Only the classification groupings of "class," "order," and "species" will be of concern here. Also, common reference terms and names will be used rather than scientific ones.

In order to identify and inventory birds and mammals on the camp property, a good field identification guide for each of these classes of animals is essential. Perhaps the three most popular field guide series are the Peterson series, the Golden series, and the Audubon series. Each series contains one or more field guides for birds and one for mammals. (These books are noted in the reference section at the end of this article.) The person or persons doing the inventory should become thoroughly familiar with the use of the field guides, noting the classification of the animals by order and noting the range maps for each species.

Before beginning the inventory, develop an inventory checklist of animals that are likely to be found on the camp property. By consulting the "Contents" section of the field guide, a list of the "orders" of the animals can be found. Unless comfortable with the scientific language, only refer to the common name. The field guide contains a written description, picture, and range map for each species within each order. Refer to the range map first to determine if that species is found in part of the country where the camp property is located. If so, list it under the proper order, again using the common name. If no species within a given order grouping is likely to be found, do not include that order on the inventory checklist.

Figure 1

CLASS: MAMMALS

Pouched Mammals
Opposssum

Insect-eating Mammals
Masked shrew
Smoky shrew
Longtail shrew
Shorttail shrew
Starnosed mole
Eastern mole
Hairytail mole

Bats
Keen bat
Little brown bat
Indiana bat (endangered)
Small-footed bat
Silver-haired bat
Eastern bat
Red bat
Big brown bat
Hoary bat

Figure 1 is an example of an inventory checklist for mammals that was developed for a property in the Pocono Mountains of Pennsylvania. The mammal field guide in the Peterson series was used in developing the checklist.

Once the inventory checklist has been completed, the job of identifying the wildlife that inhabit the camp property may begin. There are various techniques for determining if a given animal makes its home on the property:

a. *Direct observation*—Sighting and positively identifying the animal. By walking through the property at various times of the year and different times of the day, one will be able to see many of the animals that live there. Also, during the normal course of the camp day, many animals may be observed, e.g., chipmunks, rabbits, common songbirds. These should be positively identified and noted on the inventory checklist.
b. *Observation of animal signs*—If the animal is not observed directly, there may be some evidence that it exists on the property, e.g., tracks, droppings, bark rubbings, feathers, nests, etc. Several books are contained in the reference section which provide information on animal signs.
c. *Hunting*—If hunting is allowed on the camp property, the small game mammals, large game mammals, upland game birds, or waterfowl that are taken should be noted.
d. *Other techniques*—Other more sophisticated methods are available, such as live trapping, but these should be done only be a person trained in these techniques. If the camp is located near a college or university, it may be desirable to offer a cooperative agreement

whereby the camp may be used as a field station for animal population studies provided that a report of animals found on the property is submitted to the camp owner/director.

It should take at least a full year to complete the identification of existing wildlife. This will account for animals that migrate through the area and for animals that live there only part of the year. All should be noted on the checklist.

2. *Determine habitat requirements for each animal.* All animals have the same general habitat requirements—food, cover, water, and living space. At this stage of the plan's development, the specific habitat requirements for each animal should be noted. Field guides will be helpful but other sources of information, such as encyclopedias and books on individual animals, will need to be consulted. Many state game or wildlife agencies also provide booklets or information sheets on common wildlife of the state. The USDA Soil Conservation Service and the USDA Cooperative Extension Service also have helpful materials on the habitat requirements of common wildlife in the regional area where the camp property is found. Information on local units of these state and federal agencies can be located in the telephone book or obtained from a public library.

It is important to know the specific habitat requirements because these are the elements that will be manipulated in order to improve wildlife habitat on the camp property. For each animal, questions such as the following should be answered: What does the animal eat? What types of cover are needed by the animals to conceal it from predators? What type of nest or burrow does it need? What type of water source will it use (pond, stream, artificial source)? How much living space does it require? How close together will the animal nest with others of its own kind? A brief paragraph on each animal that has been found on the property is sufficient.

3. *Identify habitat types on the camp property.* An inventory of existing habitat types on the camp property is also essential before management practices to increase or enhance these areas may be considered. The types and number of various "natural units" on a given property will depend upon the size of the property, regional geographic location, and the degree of site development thus far.

Habitat types to note include: forests, fields, pond or lake, streams and rivers, wetlands, coastal beaches, areas above timberline, desert.

For each habitat type, a description of the specific area or areas should be noted. For example, forest types differ greatly across the U.S. In the Pacific Northwest, the Pacific rain forest is the dominant forest type with the Douglas fir evergreen tree towering over most species. Parts of Florida are dominated by more tropical forests, and the Northeastern woodlands consist of mixed evergreens and deciduous hardwoods. If a portion of the property has been turned into a plantation (an area of trees planted for the purpose of harvesting timber), this area should be specially noted along with the type of trees planted. Many state forestry agencies have a district forester who can assist with the determination of forest types on the property.

The nature of open fields found on the camp property will also vary by geographical region of the country. For example, in the Eastern U.S., most of these will be old farm fields, most likely bordered by stone walls or wooden fences. In the Midwest and Great Plains states these areas will most likely be natural grasslands or prairies. Something of the natural history of these areas, if any exist on the camp property, should be discovered and described.

Determining the location and extent of ponds, lakes, streams, and rivers on the camp property should be done in order to analyze drinking water sources for the camp's wildlife. If the streams have natural springs which originate on the property as their sources, these should also be noted.

Wetlands consist of saltwater and freshwater marshes, swamps, and bogs. Each type of wetland offers a unique and highly productive area for wildlife. If any of these types of wetland exist on the property, the type and the extent of the wetland should be noted. Some properties may contain "seasonal wet areas," i.e., areas that become flooded on streambeds that fill during the rainy season of the year, usually spring or early summer. Properties located in the snowbelt will also contain "seasonal wet areas" during the time of melting snows. These areas may seem insignificant to the casual observer, but they are vital areas for drinking water for many animals as well as breeding places for insects and amphibians which serve as food sources for higher animals.

Some camps may contain more unique types of natural areas such as coastal beaches, areas above timberline, or desert. If these areas are found on the camp property, information should be obtained on the role that these areas play in meeting habitat needs for their associated wildlife.

The written plan should contain a list of the natural areas found on the property, a description of each area, and a map locating each area and its extent relative to the camp property overall. The map can be simply a property outline with natural areas roughly sketched in and will become a working base map for the next step in developing the wildlife habitat improvement plan.

4. *Describe habitat management practices and projects.* The primary habitat management goal for any camp property should be to provide the widest variety of habitat conditions to encourage the greatest diversity of wildlife on the property.

Most habitat management practices are, in fact, vegetation management practices applied to the provision of food and cover for a variety of wildlife. It should be remembered that proper habitat management supplies food and cover as much as possible through natural, indigenous vegetation.

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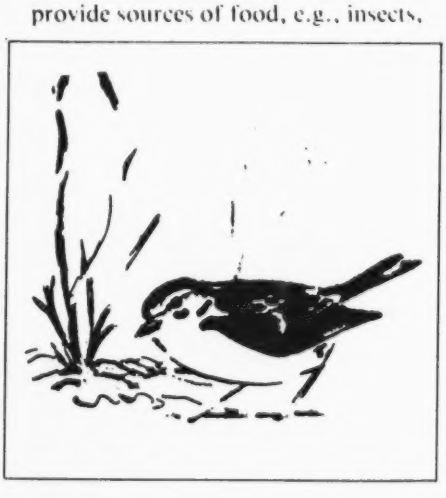
Several common habitat management practices will be discussed, but it should be realized that regional geographical differences and the particular characteristics of a given site will determine the appropriateness of habitat management practices and projects for any given camp property. The person or persons developing a wildlife habitat improvement plan should seek technical assistance from local and state agencies and local units of federal agencies specializing in resource management. Assistance available ranges from on-site review of the property by a technical expert to free or priced written materials, e.g., books, pamphlets, and reference lists. Agencies that should be contacted for assistance include the local conservation district, USDA Soil Conservation Service, USDA Cooperative Extension Service, the state forestry agency, the state wildlife or game commission, U.S. Forest Service, U.S. Fish and Wildlife Service, and resource-related departments at local colleges and universities such as biology departments, outdoor recreation resources management departments, or wildlife management departments. Non-profit wildlife education organizations that also may be contacted include the National Wildlife Federation and the National Audubon Society. Local nature centers will also be able to provide assistance. Information on how to contact these agencies and organizations may be found in most libraries.

Most camps in the country will contain forested land on at least some portion of their properties. Proper management of forest resources will include management considerations for woodland wildlife. If a portion of the woodland is to be designated as a long-range revenue source, i.e., for timber sales, then determination of the location and extent of plantations or timber management areas should be done carefully.

The impacts of timber harvesting on wildlife should be taken into consideration. There are two types of timber harvesting: selective cutting and clearcutting. Selective cutting is used to thin out a stand of trees to favor certain trees grown for a particular purpose. Selective cutting can also benefit wildlife by encouraging and sparing tree species which provide food, cover, and shelter. Crown thinning rather than low thinning should be used to open the canopy and encourage growth of understory shrubs. This method of harvesting should produce an uneven stand of trees in timber management areas and is especially suited for harvesting firewood. Selective cutting allows for a diversity of vegetation, thereby accomplishing optimum food, cover, and nesting conditions for a variety of animal species.

Clearcutting is used to take out all trees of a given area in order to obtain a large quantity of wood for timber purposes and to start over with forest succession stages. Clearcuts are highly valuable to certain types of wildlife. They open up the forest floor to sunlight which encourages growth of shrubs and grasses for food and cover. This practice also provides "edges" within the forest. "Edges" are transition zones between two types of vegetation, such as forests and fields. If a clearcut is made in an irregular shape, rather than a single square or rectangle, the amount of edge can be increased, providing increased benefits for wildlife. Animals such as deer, turkey, and grouse are especially benefitted by clearcutting. It is recommended that several small clearcuts be made rather than one or two large ones and that a buffer area be left between the edge of any clearcut and streams or lakes to prevent siltation into these bodies of water.

In removing dead and dying trees during either type of harvesting, it should be remembered that these trees provide sources of food, e.g., insects, and serve as den trees for many birds and mammals such as squirrels, raccoons, owls, woodpeckers, and porcupines. Several den trees per acre should be retained for wildlife purposes. Naturally any dead trees that pose a danger to hikers along trails should be removed.



All harvesting should be done in late fall and early winter to avoid disturbance to nests and dens during primary nesting seasons. Consult a forester or forestry agency technician before planning for woodland management that includes timber harvesting.

Another habitat management practice that should be included in the plan is to plant and/or encourage growth of certain species of trees, vines, and shrubs which provide the most benefit to wildlife. Shrubs and vines must be managed so that they are not allowed to take over an area and impede other uses. Landscaping around buildings should utilize plantings which also benefit wildlife. Hedgerows should be encouraged along field borders and pond edges (other than swimming and boat docking areas). The USDA Soil Conservation Service provides an excellent brochure on conservation plantings for wildlife that is written for each geographical region of the U.S. Generally, those trees, shrubs, and vines that provide large seeds, fruits, nuts, and berries are most beneficial. Examples of common trees include apple, aspen, cedar, cherry, dogwood, hickory, maple, ash, oak, pine, and walnut. Common shrubs that should be encouraged include blueberry, elderberry, mountain laurel, privet, sumac, sweet fern, and witch hazel. Common vines especially beneficial to wildlife include blackberry, honeysuckle, Virginia creeper, and wild grape.

Plant species to benefit wildlife

If the camp has some open field areas that are not activity use areas, some portion of these could be left unmowed to encourage growth of grasses and herbaceous plants that are native to the area. Plants thought of by many people as "weeds" are, in fact, beneficial to many forms of wildlife. Their flowers attract insects and their seeds are a food source for many

animals. Common grasses and herbaceous plants beneficial to wildlife that will be found in open, unmowed fields include curly dock, clover, dandelion, foxtail, goldenrod, milkweed, ragweed, sheepsorrel, sunflower, thistle, and wild strawberry.

Because many forms of wildlife need standing or free-running sources of water, it is important to improve the camp property to provide these sources. Naturally, projects to provide water sources may range from very simple activities to complex endeavors. If it is desirable to create a pond on the camp property, the local conservation district or the USDA Soil Conservation Service should be consulted for technical assistance. Less costly and involved projects may be undertaken, however, by most camps.

If natural springs were discovered on the property during the inventory phase of developing the plan, these springs may be improved by digging out the pool and lining the walls and edges with rocks. If there are streams on the property, these need to be free of debris. Thick, shrubby vegetation along the streambanks needs to be thinned out to provide access to the water for larger animals such as deer. Pond edges should also have openings for large animals.

Artificial sources of water, such as bird baths, may also be considered. Small in-ground pools may be constructed on camps where wildlife observation is a part of the nature program. An especially good reference on building small pools for wildlife is *A Pool for the Backyard*, available from the National Wildlife Federation.

Brushpiles made of tree and shrub trimmings may be formed in clearcuts, fields, and along woodland edges. These will provide additional cover for small mammals and birds.

Before any pesticides, herbicides, algicides or other such chemicals are used on the camp property, a thorough study of environmental impact should be made. If other than chemical methods can be used to deal with the problem, it is recommended that camps refrain from introducing toxic chemicals into the natural systems of the environment.

Several other methods of meeting the needs of wildlife may be considered in the camp's wildlife habitat improvement plan. As an example, salt licks may be placed at woodland edges and in fields to supplement salt in the diets of deer and small mammals. This also is a relatively inexpensive way to attract wildlife for observation as part of the camp's nature program. The camp also may wish to construct or buy artificial nesting boxes for common birds found on the property. Directions for construction may be found in several references at the end of this article or in other books on attracting wildlife found in most libraries. Several of the agencies mentioned earlier also provide leaflets.

A note of caution is in order for those who may contemplate artificial feeding of birds. Natural food sources, as mentioned earlier, are preferable to any program of artificial feeding. During the summer months while camp is in session, artificial feeding may be desirable to attract birds for observation and educational purposes. It should be remembered, however, that birds become dependent upon such food sources and once started, the program should be continued on a regular basis. If the camp is used over the winter months as a conference center or outdoor education facility, artificial feeding may serve as a helpful supplement during times of scarce food—especially in the snowbelt regions of the country.

5. *Determine budget requirements for implementing the plan.* The last step in developing a wildlife habitat improvement plan for the camp property is consideration of the costs required to implement the plan.

It may be necessary to employ a consultant for some areas of the plan. For example, to properly manage a woodland for timber harvesting and for wildlife benefits, a professional forester may need to be hired. Tools may need to be purchased to plant, prune, trim, or otherwise improve plants that are beneficial to wildlife. New plantings, salt licks, bird seed, and materials for building nesting boxes and feeders will need to be priced and included in the budget.

Depending upon the extent of practices and projects related in the plan, other costs may also need to be described. Many of the practices and projects suggested in this paper can be completed by camp maintenance personnel as part of their regular assignments or by campers as camp conservation projects in the nature program. Naturally if extensive projects are planned, labor costs for these will need to be determined.

It is hoped that awareness of the importance of the camp's wildlife resources has been increased by this paper.□

References

American Camping Association. *Camp Standards with Interpretations for the Accreditation of Organized Camps.* American Camping Association: Bradford Woods, 1980, p. 11.

Booth, Thurman W. Jr. and Pfitzer, Donald W. *Attracting and Feeding Birds.* U.S. Fish and Wildlife Service Conservation Bulletin No. 1, 1973.

Bull, John and Farrand, John Jr. *The Audubon Society Field Guide to North American Birds.* Alfred A. Knopf: New York. 1977. Eastern Region Edition and Western Region Edition.

Burt, William H. and Grossenheider, Richard P. *A Field Guide to the Mammals* (3rd ed.). Peterson Field Guide Series Book No. 5, Houghton-Mifflin Co: Boston, 1976.

Fromherz, Dorothy C. *Entice Birds to Your Garden.* Countryside Books: Barrington, IL, 1976.

Hassinger, Jerry et. al. *Woodlands and Wildlife: Making Your Property Attractive to Wildlife.* Pennsylvania State University Extension Service, 1979.

How to Manage Woodlands for Birds. U.S. Forest Service (USDA) leaflet, 1976.

Kindilien, Carlin. *Natural Birdscaping.* Dell Publishing Co.: New York, 1979.

Murie, Olaus J. *A Field Guide to Animal Tracks* (2nd ed.). Houghton Mifflin Co.: Boston, 1974.

National Wildlife Federation. "1983 Environmental Quality Index." *National Wildlife,* February-March 1983, p. 40.

Palmer, E. Laurence, and Fowler, H. Seymour. *Fieldbook of Natural History* (2nd ed.). McGraw-Hill Book Co.: New York, 1975.

Peterson, Roger Tory. *A Field Guide to the Birds East of the Rockies.* Houghton Mifflin Co.: Boston, 1980.

Robbins, Chandler S., et. al. *A Guide to Field Identification: Birds of North America.* Golden Press: New York, 1983.

Rogers, Elaine S. *A Wildlife Habitat Improvement Plan: Report to the Board of Directors of Stony Acres.* Summer 1983, p. 13-14.

Roth, Charles E. *The Wildlife Observer's Handbook.* Prentice-Hall: Englewood Cliffs, 1982.

Sharp, W. Curtis. *Conservation Plants for the Northeast.* Soil Conservation Service (USDA) Program Aid No. 1154, 1977.

Shaw, Sam. *Managing Woodlands for Wildlife.* U.S. Forest Service (USDA), 1975.

Wildlife Habitat Improvement. National Audubon Society: New York, 1974.

Wilkinson, Robert E. *Camps: Their Planning and Management.* C. V. Mosby Co.: St. Louis, 1981, p. 12.

Acid Rain

Education, Action Needed to Fight This Hidden Threat to Camps

by Donna L. Nye

CAMPING MAGAZINE, SEPTEMBER/OCTOBER 1983

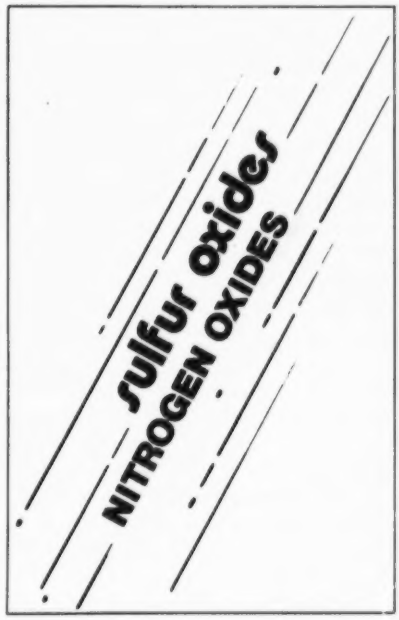
Is the aquatic life in your camp lake or pond dying? Is your plumbing system corroded? Is your drinking water contaminated with poisonous lead or copper? These can be symptoms of acid rain falling in your area. Acid rain has fallen on every state in the nation, and the effects of acid rain can have an impact upon your camp property and program.

Just what is acid rain?

Acid rain is an unfortunate by-product of our technologically advanced society. The combustion of fossil fuels such as oil and coal releases sulfur oxides and nitrogen oxides into the atmosphere. These pollutants combine with water droplets in a complex chemical reaction and fall to the earth as acid rain, sleet, or snow.

The pollutant components of acid rain have no regard for political or geographic boundaries. The northeastern part of the United States and Ontario have been seriously affected by emissions from the heavily industrialized Midwest. Super-tall smokestacks designed to remove pollutants from local areas continue to deposit pollutants into the atmosphere. The prevailing winds transport the pollutants eastward. The resulting acid rain can have harmful effects upon both plants and animals.

Relative acidity is measured on a pH scale ranging from 0 to 14. A pH reading of 1.0 is strongly acidic, a pH of 7.0 is neutral, and 14.0 is highly basic. The pH values are logarithmic. Each unit of 1.0 below 7.0 is 10 times more acidic than the value before it; each unit above 7.0 is 10 times more basic. Thus, a subtance with pH 4.0 is 100 times more acidic than a subtance with pH 6.0. A subtance with pH 8.0 is 10 times more basic than a subtance with pH 7.0.



Most literature refers to the pH of unpolluted rain as 5.6. Recent studies have indicated that unpolluted rain has always been a good deal more acidic, perhaps as low as 5.2. Forest fires, volcanoes, decomposing matter in wetlands, and sulfates from the ocean, as well as carbon dioxide in the air, are all contributors to acidity.

Environmental effects

Acid rain is a silent killer. Most species of plants and animals are intolerant of pH values only slightly lower than those that occur naturally. Most fish cannot survive below pH 5.0. Other aquatic life perishes too; frogs, salamanders, and most aquatic insects die until the lake or stream is nearly lifeless. Over 200 lakes in New York's Adirondack Mountains are unable to support fish; 256 more lakes in that region are approaching that condition.

An article in *Sports Illustrated* provided the following statistics indicating that acid rain is not a problem just in the Northeast. More than 150 miles of West Virginia trout streams are too acidic in the spring for stocking to be successful. The spring runoff from melting snow packs a potent, concentrated dose of acidity which is lethal to fish. A 1978-79 survey of 85 lakes in the Boundary Waters Canoe Area on the Minnesota-Ontario border found that two-thirds of the lakes had reached the critical pH for fish survival. In 1980, the average pH for precipitation at Yellowstone National Park in Wyoming was 5.2. Rain in parts of California is as acidic or more acidic than that of other regions of the country.

The regions of the country most sensitive to acid rain have little or no alkalinity available in the soils or bedrock to neutralize acid rain. With each dose of acid rain, the natural alkaline buffers in the water are consumed. Scientists can test the alkalinity of a lake to determine its ability to buffer acid rain.

Immediate effects to your campsite

It has become increasingly obvious that large areas of the United States and Canada cannot tolerate the current levels of acid rain. Depending upon the geographic location of your camp and the buffering capacity of the soil, your camp could be affected by acid rain in a variety of ways.

Your lake, pond, or stream—often the camp's most important program resource—may already be or could become heavily acidified. An acidified lake has a distinct appearance—still, clear, with little movement other than wind rippling the water. Most aquatic

life has died. An acidic lake is never completely lifeless, but its population is reduced to a few acid-tolerant species such as sphagnum moss, filamentous algae, and aquatic insects like water boatmen and backswimmers.

Sometimes thick mats of algae form at the bottom of a pond. Anaerobic bacteria decompose this plant material and release carbon dioxide, hydrogen sulfide, and methane. During the warmest months, the pond may have a very unpleasant odor. Under acidic conditions, decomposers such as bacteria, fungi, and aquatic insects cannot survive. Therefore, leaves which would normally be decomposed after falling into water are not broken down. Leaves build up and cause ponds to fill in faster, speeding the rate of succession.

Although there have been no reports of individuals being "burned" by acid rain, human health may be jeopardized in a more insidious way. Toxic metals such as mercury may be dissolved by acid rain and washed from the soil into the closest body of water. These metallic ions may enter systems providing water for your camp. Acidic water may leach copper or lead from pipes causing copper or lead poisoning. The plumbing systems in camp may also become corroded.

In ponds, lakes, or streams mercury may move through the food chain of consumer organisms until the mercury becomes deposited in the fatty tissues of fish. Any fish eaters, including humans, may become contaminated with mercury. Birds, mink, otter, and other wildlife that eat fish may be lost. Fishing (and eating the fish) may be restricted or eliminated because of acid rain.

Data are still being collected, but scientists have found that acid rain can injure the protective waxy surface of leaves, interfere with the gas exchange in leaves, and decrease photosynthesis and seed germination. Some types of trees on your camp property may be susceptible to acid rain. Crops in a camp farming program may be stunted or fail.

Repeated acid rainfalls may ruin camp building exteriors and automobile bodies. Gravestones, used for historical purposes or stone rubbings for craft projects, may be damaged beyond recognition.

The varied effects of acid rain are cause for concern and action. The United States has established a National Atmospheric Deposition Program with stations set up across the country to monitor acid rain. At Cornell University, an acid-resistant strain of brook trout has been bred. Both Canada and the United States have experimented with liming lakes to neutralize the effects of acidity, but this is an expensive, impractical, and stop-gap measure at best.

Some individuals in government and industry have questioned the seriousness, the causes, and the solutions to the acid rain dilemma. There seems little doubt that increased burning of fossil fuel is responsible for lowering the pH values below 5.0. The industrial contribution to acid rain is a critical trigger that is difficult to quantify and measure. It is this uncertainty that makes formulating and defending Clean Air Act legislation difficult.

The consequences of acid rain must be met head-on: a strong Clean Air Act should be promoted as the principal tool to fight acid rain.

What you can do

As a camp administrator, if acid rain is a concern to you, one approach may be to encourage your staff to practice the conservation of energy. Urge staff and campers to save electricity by turning off unnecessary lights. Combine auto trips and burn less gasoline. Try to promote a conservation ethic in your camp.

Check with your local wildlife, community, and health department officials to see if they share your concerns about acid rain. Find out if acid rain is being monitored in your part of the country.

Educate your staff and campers. Acid rain monitoring could be a program activity carried out by groups using your camp during the year. The pH of bodies of water or of rain may be measured by several methods. The most precise and expensive way is to use an electronic pH meter. Several companies also sell pH test kits which are more moderately priced. The simplest method utilizes pH paper. Acidity data which is collected over a period of time may alert you to an impending problem. A single acidic reading does not necessarily indicate a problem. Establish a log book for groups to record their findings throughout the year.

In the last analysis, the acid rain issue will be resolved by an involved, concerned public. Your views may be expressed to your congressional representative; add your voice to those of the environmental groups battling the causes of acid rain. The consequences of acid rain must be faced head on: a strong Clean Air Act should be promoted as the principal tool to fight acid rain. We should encourage the continued funding of studies to provide data about acid rain. Our commitment to a safe environment must remain steadfast. The strength of our camping program rests in a clean and healthy world for children. □

References

LaBastille, Anne. "Acid Rain—How Great a Menace?" *National Geographic*, Vol. 160, No. 5, November 1981 pgs. 652-680.

Boyle, Robert. "An American Tragedy" *Sports Illustrated*, September 21, 1981 pgs. 68-82.

Galloway, James N., Likens, Gene E., et. al. "The Composition of Precipitation in Remote Areas of the World" *Journal of Geophysical Research*, Vol. 87, No. 11, pgs. 8771-8786, October 20, 1982.

Luoma, Jon R. "Troubled Skies, Troubled Waters" *Audubon*, November 1980.

Research Summary—Acid Rain, United States Environmental Protection Agency, October 1979 EPA-600/8-79-028.

"Downwind—The Acid Rain Story," Environment Canada, Ottawa, Ontario, Minister of Supply and Services, Canada, 1981. Cat. No. EN 56-56/1981E, ISBN 0-662-11421-3.

"Acid Rain Information Pamphlet," American Chemical Society, October 1982.

IV. Preventive Maintenance

Maintenance Man Wears Many Different Hats

Variety of Skills, Planning Ability, Good Business Sense, Public Relations Awareness Are Important

by Jack Stevenson

CAMPING MAGAZINE, MARCH 1976

A well cared for physical plant attracts parents and campers to your camp. Facilities that look good and have built-in safety are especially important to parents. Looks are the direct result of the work of the person responsible for maintenance and this person makes a big contribution to the success of any camp.

Good maintenance men are not easy to find. Business and industry frequently offer better wage and benefit plans than camps can offer. More and more, industries are moving to rural lands, locating their plants and offices in areas near camps. For owners and directors of camps this makes competition difficult for staff employment, especially of persons who can fill the job of maintenance man.

With definite need for a good maintenance man in camp, and with stiff competition for his services, camp leaders responsible for employing these persons need all the help they can get. The following suggested characteristics and qualities may serve as guidelines. They are a composite for few if any men would have all these qualities. Most directors are fortunate to obtain the services of a man with even a majority of these qualities. The characteristics are not necessarily listed in priority order.

(1) *Satisfaction in work*–Much of his work is with his hands. If basic needs of his are met in working with his hands, he will feel satisfaction from his work. He will then sense or know that his contribution is important to the teamwork of the overall camp staff. If this satisfaction is present it will increase the effectiveness of the other characteristics.

(2) *Variety of skills*–This man should have adequate skills in many areas including carpentry, electricity, plumbing, roofing, machinery and motor repair, road maintenance, and turf management. He may not have his state licenses or union card in any of these, but he should be able to use these skills in basic maintenance of plant and equipment as well as in construction when legally permissible.

(3) *Pride of workmanship*–A trait not always available today but important nonetheless is pride: pride in the way things look, pride in the smooth operation of equipment, and pride in keeping them that way. Seldom easy to develop in adults, this quality usually needs to come to camp with the man!

(4) *Work under variety of conditions*–In the summer, hours are long and hard for the camp maintenance man. His efforts often are to "patch up and keep things going till the season is over." (This does not meet the need for pride of workmanship!) In the winter, work hours and days may be shorter, and he often must work alone or with a much smaller crew. In many camps, winter weather makes working conditions uncomfortable if not nearly impossible. Still he has some 40 weeks of non-summer work to get the plant ready for the all-important 10-12 weeks of summer season.

(5) *"A way with people"*–While mainly occupied with things, the maintenance man must still interact with many kinds of people. He must supervise his crew (often high school boys, in season), remain friendly with campers and staff who borrow or liberate his tools and equipment, show visiting parents around camp in the off season if the director is away, and keep good relationships going with salesmen, suppliers, and deliverymen who provide him with equipment and materials for his work. In interacting with all these people he should be able to answer questions, be friendly, loyal to his employer and knowledgeable of the camp philosophy and program. Especially in summer he needs to develop and keep friendly and positive relationships with campers. In a camp with girl campers and staff, these relationships, it must be said, can have no sexual overtones.

(6) *Like himself*–If he likes himself, feels "OK" and has a positive self-image, he will likely have a way with people. He will also be less tempted to manipulate or use people, especially females. He will be less threatened in crisis situations and will be less likely to over-react. He will be a better public relations man in every way to the camp if he has this mentally healthy trait of liking and accepting himself. Important for the director, he will receive and follow instructions easily too!

(7) *Business Sense*–The camp budget has line items dealing with maintenance. The person responsible must know how to stay within his part of the budget. Therefore, he should know how to buy selectively and wisely, through bids getting the most and best quality possible,

(continued on next page)

considering his budget limitations. He should, for example, be familiar with various qualities of lumber, wire, roofing, plumbing supplies, and other lines in his area of responsibility—and which ones to buy or use within safety and economic guidelines for his camp. He should be able to cope with sales slips, invoices, voucher slips, check-in and check-out forms, work requests and inventories.

(8) *Skilled driver*—A current driver's license and valid chauffeur's license where applicable are necessary for the maintenance man. More than this he should be skilled at driving safely whatever rolling equipment the camp owns—trucks, cars, tractors, jeeps, or even riding lawn mowers if he should be so fortunate! Where campers are being transported, safe driving is a must, and the maintenance man often is pressed into this service.

(9) *Interdepartmental awareness*—The organized camp includes at a minimum program, business, health, food services, and maintenance departments. The maintenance man should know the relationship of mutual dependence his department has to each other department in camp. He should be aware of how his department can assist each of the others, and how the others can assist his department.

(10) *Like rural living*— Usually a married man, the maintenance man and his family should know and like the rural life that goes with his job. Children riding the school bus, few neighbors, long and often lonely winters, contrasted with non-stop summers are all part of his job. "Ya gotta love it" to live with it, and the man considering this position should be apprised of these factors in his living conditions.

(11) *Planning ahead*—He should know how to read blueprints and master site plans with utility locations marked on them. Better still, he should know how to use them in his overall preventative maintenance efforts. Included in this should be, of course, a master maintenance calendar which the maintenance man develops, advising with the camp director. Plans for opening and closing the seasonal camp as well as month by month plans are necessary for the most efficient use of his skills and time. Planned preventative maintenance can be the best investment that this person contributes to the overall camp community.

Buildings and grounds will look better, safety will be planned more efficiently and staff and campers will be more satisfied being at the camp where the maintenance man has most of these characteristics. Few if any persons will have them all in high degree, but the more of these traits a maintenance man possesses, the more fortunate the camp which employs him. "A good man is hard to find" so the song goes. A good maintenance man when found is a very special part of the camp community.

Property Management Audits

Don't forget Your Camp's Yearly "Physical"

by John Murray

CAMPING MAGAZINE, SEPTEMBER/OCTOBER 1982

Increase membership. Reduce costs. Implement new programs. Sound impossible? It isn't through the use of a Property Management Audit (PMA).

The PMA is a diagnostic tool. It is like taking your camp to the doctor. The doctor listens to its heartbeat, takes its blood pressure, weighs it to see if it is overweight, and asks questions. Is it operating smoothly, adjusting to changes in use, and functioning well under heavy and light stress?

A Property Management Audit should not be confused with an accounting audit which most agencies conduct every year. By taking a look at the overall picture, it is more general in nature. Its purpose is to draw conclusions based on all the parts of the business—not just finances. It evaluates and applies these conclusions and identifies their implications as they relate to property planning, site and facility operation, and maintenance.

The PMA is a management tool. By stimulating constructive thinking by staff as well as management, it gets everyone working together for a common goal—a better managed camp. Effective management benefits everyone: management, staff, and users.

The PMA identifies five basic management functions: planning, organizing, staffing, directing, and controlling; and provides for their input into the development of a property management system.

According to Harold Koontz and Cyril O'Donnell in *Principles of Management:*

Planning identifies goals and develops policies.

Organizing sets objectives and delineates activities to be performed which will achieve the goals by grouping activities and assigning them to personnel, thereby delegating authority and responsibilities.

Staffing keeps positions filled.

Directing guides subordinates through their activities.

Controlling compares performance to results and modifies when necessary.

Plan for the future

The PMA is more than a review of the past; its main objective is to plan for the future. All too often property management decisions are made in a vacuum, unrelated to other considerations such as program design, public relations, membership recruitment, and fund development. By reviewing past performance, the PMA can identify the camp's strengths and weaknesses, analyze the causes and results, and develop a property management system to build on identified strengths and to help eliminate weaknesses.

All too often property management decisions are made in a vacuum, unrelated to other considerations such as program design, public relations, membership recruitment, and fund development.

Many camp owners have not been exposed to the concept of a general management audit and even fewer to a property management audit. Even agency camps with larger national organizational structures may have had management audits at the national level without specific application to individual camps. Originally, management audits were designed for large corporations and the complex nature of these audits did not lend itself to camps or camp property management. Thomas Shultz, assistant treasurer of SCM Corporation stated, "We've been using management audits for years and they have proven quite successful. One of the key elements, however, is that they must be designed to meet the individual needs of the companies being audited."

To be effective, the PMA must be objective. For this reason, the use of an external auditor is advisable. The auditor should demonstrate competency not only in management auditing, but also in property management. In addition, he or she should possess a clear understanding of the peculiarities of each individual client, in order to draw accurate conclusions resulting in implementation.

Most importantly, adequate resources must be allocated for the property management audit. Peter Drucker, in *Management: Tasks, Responsibilities, Practices*, reminds us that the best management plan, without commitment of resources, is nothing more than promise and hope.

Camps vary tremendously in size, type of ownership, geographic location, program, facilities, and staffing patterns. Many are planning new program or service facilities or upgrading existing ones to meet changing trends and government regulations. For this reason, it is difficult to generalize the questions that need to be asked in a property management audit.

In the PMA questionnaire which follows, eight questions have been provided which represent some of the topic areas addressed in a full-scale PMA. Each question is accompanied by a paragraph which explains it so that all those being questioned have a clear understanding of what is being asked. For the questionnaire which follows, certain assumptions were made. The camp is privately owned with several pieces of property. There is one property manager and three site superintendents, one at each site.

PMA Questionnaire

Is your camp appropriately located to serve your market segment?

At a time when energy conservation is a prime consideration, is your camp

(continued on next page)

strategically located to serve your market? If not, have you considered changing your camp location or changing the market which you serve?

yes somewhat no

Do you make use of market research?

This does not mean only conducting your own market research but rather making use of research being done by others related to your field. What is ACA, business, or industry saying? School districts and telephone companies keep current data on population trends, average family size, age groups, etc. Make use of this valuable planning data. It is there for the asking.

always sometimes rarely

Do you know your share of the market?

What population do you serve and how many other camps in the area are serving the same market? Is there enough to go around? Have you considered changing your market?

yes somewhat no

Are you aware of current program trends?

Is your program current with today's thinking or is it ten or even 20 years behind the times? Have you addressed the changing role of women, women's sports, high-risk activities, youth-at-risk, environmental awareness, careers, the disabled, the aging?

always somewhat rarely

Do you advertise to increase your market?

If you have new and exciting programs and facilities, telling the same old group does not help much. Have you investigated new market segments and advertised in that market?

always sometimes rarely

Do you have an accurate tracking system?

If someone goes to your camp and not someone else's, do you know why? What other camps were they considering and what swayed their decision? Do they intend to return to your camp and if not, why not?

yes somewhat no

Do you have a property management plan?

This should include but not be limited to an analysis of existing resources, including sites, facilities and staff, demographics, operational costs, and projected income, with conclusions and a course of action as they relate to the operation and maintenance of existing facilities, the development of new facilities, or the purchase or sale of property for program and service.

yes somewhat no

Does such a long-range plan allow for change?

All too often long-range planning is done with no provision for evaluation. Unless a long-range plan is evaluated and updated every three to five years, current trends will render it invalid.

yes somewhat no

□

Camp Maintenance Is a Year-Round Job

by Robert J. Armstrong, Jr.

CAMPING MAGAZINE, MAY 1975

BY ROBERT J. ARMSTRONG, JR.
Maintenance Supervisor
Henry Kaufmann Campgrounds
and Alice N. Proskauer Day Camp

Too many camp owners and operators indulge in the thinking, "After all, we only use the camp two or three months out of the year; most of our equipment should last forever at that rate."

Wrong. Not only do we live in a society in which obsolescence is planned, but most camps at the peak of their season overuse and abuse many parts of their facilities and equipment.

Maintenance, especially preventive maintenance, must start when the equipment and facilities are brand new and continue on a predetermined schedule until a piece of equipment or part of a facility is replaced. Replacement expenditure should also be on a predetermined schedule.

Most camps on which I've done maintenance inspections and the ones where I've worked have let operations go so far downhill that simple maintenance procedures cannot bring them back to par. If they had had a conscientious, year-round maintenance program as an integral part of their operation I don't believe this would be the case.

But when you overuse your equipment and facilities for two months, then shut down quickly and store everything in a haphazard manner, and don't do anything about it until the following spring, you are likely to start out your next season with a pile of malfunctioning junk. Some equipment actually deteriorates faster when not in use, especially if it isn't stored properly.

Fall and winter are the time to set up your maintenance program and get it rolling. There is little time during the peak season to carry out the major maintenance a camp requires.

For example, suppose the swimming pool has a serious leak. You're losing 8,000 gallons of water every 24 hours. You cannot shut down your pool operation, for this is the middle of your season.

You can't bring in equipment and contractors to dig up your pool and make the necessary repairs. You must keep it limping along until the end of the season or your campers will leave and go to someone else's camp where they can swim.

Another example is roofing. You can't replace the roofs on cabins and other buildings while they are in use.

Contrary to popular opinion, roofs don't last forever. They have to be repaired and replaced periodically, especially in camp settings where they get heavy snow loads, etc.

The time to do this maintenance is in the fall, immediately after closing. Don't let it go until the spring.

It is better to run into problems in the fall, when you have the time to make the proper decisions, then in the spring when you have rapidly approaching deadlines because you're getting ready to open for the summer.

If you have a year-round maintenance person, jobs can be scheduled to get done in the fall and winter. Together, you can determine what kind of part-time or temporary workers are needed to help with the job or get estimates from contractors and have your maintenance person supervise (or oversee) them for you while they complete the work.

Your supervisor can make the decision whether to spend $5.00 now to keep a piece of equipment running properly or to let it limp along because it's old, then replace it when it quits.

Your year-round person can catch the vandals who have been breaking into your buildings and costing you money in repairs. Or, even if they are not caught, prompt attention can be given to repairing the damage and securing the building so that vandalism doesn't snowball.

Believe it or not, proper maintenance can also generate income for the camp. It will keep campers coming back and will definitely help with new enrollment.

If prospective customers walk into a camp that is falling apart it doesn't matter how good your program is, they are not going to pay to send their children to your camp.

You need a full-time maintenance program, especially during the current economic crisis where every dollar spent must be carefully weighed. Whether it takes one person or 20 is up to your individual situation. A full-time maintenance supervisor and staff will definitely save you money. The benefits will be evident in the spring with the ease of opening a well-maintained camp.

Camp Pool Maintenance

by William P. Markert

CAMPING MAGAZINE, FEBRUARY 1979

There's not a more refreshing sign of summer camping than a sparkling swimming pool. But a pool's value depends on its condition.

Is the water clear? Are accessories safe? Is equipment working at top efficiency? Is the pool itself in good repair? These quesions must be answered affirmatively before any pool can be opened for the summer.

The only way to be assured that a pool is ready for summer traffic is to call on a pool professional. Although a groundskeeper or maintenance person may excel at his regular tasks, he simply cannot be expected to master all the technical complexities of pool maintenance. Call a professional at the beginning.

A pool professional is thoroughly educated in his field. It's his business to know everything there is to know about pools—wiring, plumbing, equipment maintenance, pool repair, and chemistry. In addition, he knows the variables of climate, soil composition, and water conditions that make each pool unique.

Conditions vary from place to place, and a pool professional in Florida will hardly speak the same language as one from Tennessee, much less Wisconsin. But all are aware of conditions specific to their areas, and of the maintenance requirements of the various types of pools and equipment.

To get a pool ready for summer, a professional should inspect the pool and all its equipment, identify what repairs and preventive maintenance are needed, and prescribe a program of regular chemical and equipment maintenance.

He will begin by inspecting filters, pumps, lights, and other electrical equipment to see that it operates efficiently in accordance with local codes and that there is no defective wiring. Even a slight leakage of electrical current can cause corrosion of metallic parts, a condition which will be further aggravated by chlorine. If a switch has worn out or insulation is worn, the pool may actually be dangerous. Any needed electrical repairs must be made immediately.

Different pool equipment companies naturally have different service requirements for preparing their products for a new season. This preventive maintenance, performed by a professional who knows what to do with which equipment, can save costly repairs at a later date.

An inspection of pool accessories will determine if the diving board needs resurfacing or if bolts should be tightened or replaced. The deck area will also be checked for slipperiness.

It may be necessary to drain the pool to determine whether repairs or repainting are necessary. If so, the pool service company will remove loose paint from the walls, bottom, and deck, then thoroughly scrub the walls and bottom to remove dirt, grease, and algae. The pool must be painted with a coating that is compatible to the type used previously. A pool professional can determine whether rubber base, water base, vinyl, or epoxy is required.

During inspection, all pool plumbing will be checked to make sure it is functioning correctly. If the pool was not closed properly in the fall, it may be necessary to replace broken pipes—a good reason to keep your pool professional in mind when it's time to close next fall.

Working with a professional is the best investment that can be made in preparing a pool for the new season.

Of course, proper pool care doesn't end when the swimming begins. Once a pool is open, a continuing program of maintenance is needed to keep it sparkling, safe, and functioning properly.

A pool professional can prescribe care for specific needs; but for staff members charged with regular pool maintenance a professional guide is an excellent investment. In response to requests from pool operators, the National Swimming Pool Foundation has produced a *Swimming Pool Operators Handbook*—a 135-page booklet written by Professor David G. Thomas of the State University of New York.

The book is sold by the foundation and covers pool chemistry and testing for various water characteristics, suggested treatments for specific water problems, operation and maintenance of pool equipment, checklists for periodic inspection and maintenance, suggested forms for recording operational data, information on seasonal pool care, and details on the use, care, and maintenance of all types of filters.

A pool operators training program developed around the book is also available through the foundation. The program, which can be used by groups of any size, includes slides, texts, a trainer's guide, exams and certificates. □

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You Really Can Manage Your Maintenance Work

JOURNAL OF CHRISTIAN CAMPING, JULY/AUGUST 1980

As a means for keeping up-to-date on complete camp maintenance, Sambica of Bellevue, Wash., uses the following monthly checklist.

Monte Lauritzen, Sambica's former Guest Group and Food Service Director explains, "The maintenance calendar provides the director with a tool to insure an on-going complete program. It also does away with interruption when changing personnel. This checklist gives you a basic program that a new maintenace man can review before you hire him. That way he knows what his job encompasses and the two of you agree on the need for the monthly maintenance tasks."

You will probably want to modify this checklist to fit your needs. There may be areas at your camp that are not mentioned on this list.

Mr. Lauritzen suggests attaching maps showing the exact location and identifying numbers of items like garbage cans, smoke detectors, fire extinguishers, drainage problem areas, water shut off valves and so on.

Also have the name, phone number and address of your repairman and maintenance suppliers attached.

For a complete maintenance manual Mr. Lauritzen recommends listing the tasks on separate calenders for each month as well as the written list. The written checklist should identify the tasks to be accomplished and a description of what is necessary to complete the task.

Summer staff daily work assignments should also be included in the maintence manual. This would enable a new person or temporary replacement to know what work has to be done and how.

Calendar pros and cons

Positive Features

- It distributes work evenly over the year so you don't have it pile up at any one time.
- It's a reminder so that work is done when it is supposed to be done — also schedules those items that require monthly or yearly maintenance.
- Provides the director with a tool to use with an inexperienced maintenance staff to insure a complete program.
- Enables the camp to have reference material concerning the operation to pass on from one maintenance man to the next — also enables someone to step-in in case of illness or leave of absence.
- Any information that is recorded means it doesn't have to be continually researched or rethought.

Negative Features

- Camp maintenance staffs are generally understaffed and consequently are manipulated by immediate needs (emergencies) rather than organization. It's difficult in some situations to get organized.
- Getting an experienced maintenance man to use the format. This is a selling job for the director.

Maintenance Checklist

JANUARY

Service Camp vehicles
1. Lube job
2. Oil change
3. Tune up
4. Check tires, mirrors, lights, belts, hoses.

Check smoke detectors
1. Check each smoke detector on attached list. Check light should flash every sixty seconds. If light does not work, replace batteries. (Or follow directions for testing your particular model.)

Clean garage
1. Discard unusable materials.
2. Make sure everything is in the proper place.
3. Remove any foreign objects from front, sides and back of garage.
4. Sweep out garage

Check drainage areas
1. In front of lodging and other buildings.
2. Attach a list of "trouble" areas.

Check vacuums
1. Check belts, motors.
2. Remove strings from brushes.
3. Tighten all screws or nuts.
4. Repair electrical cord if needed.
5. If major repair needed, contact repairman (it's a good idea to have your repair shop's address and phone number listed here).

FEBRUARY

Check smoke detectors
1. Follow instructions for smoke detectors in January.

Clean garage
1. Follow instructions for January.

Clean garbage cans
1. Empty garbage cans and wash interior and exterior with soap.
2. Return cans same day.
3. Pick up cans from all locations on an attached map.

Prune trees
1. Remove dead branches from trees throughout property.
2. Prune fruit trees, if any.

MARCH

Check smoke detectors
1. Follow instructions for smoke detectors in January.

Clean garage
1. Follow instructions for January.

Check and repair crafts, snack bar and athletic equipment
1. Athletic equipment — including trampoline, waterfront equipment.
2. Snack bar — refrigerator, freezer, snow-cone machine.
3. Crafts — kiln, stove, heater.

Check vacuums
1. Follow instructions for January.

APRIL

Service Camp vehicles
1. Follow instructions for January.

Service tractor and lawn mowers
1. Oil change - 30 W
2. Grease wheels, motor blade hubs.
3. Sharpen blades.
4. Tighten screws and bolts.
5. Tighten screw on acceleration lever.

Turn on water
1. Attach a list or map of outside valve locations.

Adjust water drinking fountains
1. Give locations

Check smoke detectors
1. Follow instructions for January

Clean garage
1. Follow instructions for January.

Sharpen tools
1. Shovels, axes, hoes, etc. (outdoor tools)
2. Saws, chisels, etc. (indoor equipment)

Building inspection
1. Check interior of buildings for broken windows, damaged doors, need for painting, missing switch or plug plates, broken furniture, rugs coming loose, plumbing leaks, running water, etc.
2. Check exterior of buildings for water damage, loosened rain gutters, need for paint, loose railings, loose boards, etc.

Repair road signs
1. Clean away growth.
2. Repaint if needed.
3. Replace supporting posts if needed.

Job assignments for summer staff
1. Make up job descriptions for summer employes for daily, weekly, and monthly assignments.

Prepare equestrian area
1. Repair corral fencing.
2. Clean out barn.
3. See that water is working
4. Have tack ready.
5. Purchase feed for summer.
6. Clean up riding area.

Reseed worn lawn areas
1. Determine whether worn areas need reseeding, fertilizer, or replacement by a pathway. Follow through.

Check laundry facility
1. Have two dryers, two washers operational.
2. Remove all unnecessary items from area.
3. Put instruction sheets on each piece of equipment clearly describing steps of operation.

Check boat batteries
1. Check batteries to see that they are fully charged.
2. Return them to boathouse.

Check power boats and outboards
1. Check boats for any damage from winter.
2. Put plugs back in and prepare boats for operation.

MAY

Docks and accessories
1. Replace air drums, planking.
2. Repair diving boards, slide.
3. Clean up beach area.
4. Give paint coat to areas requiring it.

Rope with floats
1. Proper lengths, not pieces.

Check smoke detectors
1. Follow instructions in January.

Clean garage
1. Follow instructions in January.

Work flowerbeds and garden areas
1. Spade up and remove weeds (list areas).

Set out plants
1. Set plants in areas designated by supervisor.

Clean garbage cans
1. Follow instructions in February.

Clean barbecue grills
1. Use wire brush to remove rust from grill.
2. Paint exterior of units black (do not paint grill).

Extinguisher Inspector
1. Call fire chief or extinguisher company for an inspection (list phone number).
2. Make sure extinguishers are in areas designated on the attached master list or map.

Ready tools in outlying areas
1. Boat house: Crescent wrench, phillips screw driver, conventional screw driver, pliers, hammer.
2. Country kitchen: Pliers, conventional screw driver, hammer

Tune pianos
1. List name and phone of tuner.
2. Tune pianos (list location).

Check audio systems
1. Check and repair cords, microphones and stands.
2. Check speakers and amplifiers.

Repair lawn furniture
1. Replace or nail down loose or broken slats.
2. Repaint.

Check vacuums
1. Follow instructions for January.

JUNE

Clean garage
1. Follow instructions in January.

Clean garbage cans
1. Follow instructions in February.

Repair tools
1. Replace frayed cords and ends with exposed wires.
2. Replace broken handles.
3. Repair or discard all broken tools.

Service tractor
1. Follow instructions in April.

Check smoke detectors
1. Follow instructions in January.

Maintenance budget
1. Review year's expenses with supervisor.
2. Project expenses for coming year.
3. Identify specific project and equipment needs with cost figures for coming year.

Life jackets
1. Repair or replace

Oil all kitchen equipment
1. Food chopper
2. Hobart floor mixer
3. Dishwasher motor
4. Meat slicer
5. Motor on exhaust fan in kitchen
6. Fan motors in lodging areas

Clean branches from electrical wires
1. List locations where this needs to be done.

Exterior painting
1. Paint exterior of buildings budgeted. Check with supervisor.

Order gas
1. Order 500 gallons at a time but do not oversupply for winter months.
2. Order from: (list name, address, and phone number).

JULY

Service Camp vehicles
1. Follow instructions in January.

Check smoke detectors
1. Follow instructions in February.

Clean garage
1. Follow instructions in January.

Clean garbage cans
1. Follow instructions in February.

Repair roofs
1. Recover complete roofs that were budgeted. Check with supervisor.

AUGUST

Check smoke detectors
1. Follow instructions in January.

Clean garage
1. Follow instructions in January.

Clean garbage cans
1. Follow instructions in February.

Firewood
1. Stack firewood in areas needed (list locations).
2. Take crew off grounds to replenish wood supply.

Service tractor and lawn mowers
1. Follow instructions in April.

Clean drainage areas
1. Follow instructions in January.

Clean all heaters
1. Vacuum all heaters (list locations).
2. Replace filters.
3. Clean burners.

SEPTEMBER

Furnace inspections
1. Call inspector (give name and phone number).
2. (List areas to be inspected.)

Check smoke detectors
1. Follow instructions in January.

Clean garage
1. Follow instructions in January.

Building inspection
1. Follow instructions in April.

Check audio systems
1. Follow instructions in May.

Check vacuums
1. Follow instructions in January.

Drain power boats
1. Pull plugs from inboards and drain.
2. Make repairs before winter storage.

Repair leaks in canoes
1. Repair and store

Revarnish oars and paddles
1. Revarnish and store

OCTOBER

Service Camp vehicles
1. Follow instructions in January

Boat batteries removed and charged
1. Take batteries from boats, charge and store.

Check smoke detectors
1. Follow instructions in January.

Clean garage
1. Follow ins ructions in January.

Clean rain gutters
1. Clean pine needles and leaves from all gutters.

Winterize cabins
1. Cover cabin windows with clear plastic.

NOVEMBER

Check smoke detectors
1. Follow instructions in January.

Clean garage
1. Follow instructions in January.

Clean garbage cans
1. Follow instructions in February.

Turn off water
1. Insulate faucets, standing pipes and shut off valves.
2. Attach a map showing locations.

Drain pool
1. Drain water from pool.

Check drainage areas
1. Follow instructions in January.

Clean rain gutters
1. Follow instructions in October.

Check vacuums
1. Follow instructions for January.

DECEMBER

Check Smoke detectors
1. Follow instructions in January.

Clean garage
1. Follow instructions in January.

Nice Floors Catch the Eye

by Leonard Campbell

JOURNAL OF CHRISTIAN CAMPING, MARCH/APRIL 1981

Proper care of floors is important for two reasons. First impressions are fixed impressions, and upon entering a room the floor is the first item that catches the eye. Also, today's finishes are designed to take the wear load for a period of time thus giving protection to the floor surface.

The end results in upgrading floor maintenance may well be worth any extra money it takes. Investing in equipment and then training staff on proper handling and procedures might be necessary in your situation.

There are many varied types of floors: cement, wood, asphalt or vinyl asbestos tile, sheet floor coverings, permanent finish sheet (or tile) vinyl floor coverings. Eash area requires different care and maintenance schedule.

CEMENT. Many people do not realize how important it is to properly maintain a cement floor. Once cement is completely cured it soon begins to deteriorate. This is why a constant dusting of the floor will be noticed as it is cleaned or used in a heavy traffic area.

Painting a cement floor can be a great mistake since the paint is easily scratched and in a short time the floor becomes very unsightly. Stains can be successful, but in most cases I have seen, it doesn't dry evenly. The best way to achieve a color is to use colored cement at the time of pouring, but even then if it is troweled too much it will give color variations.

Personally I have decided that cement in its natural color can be made into a beautiful floor using clear sealers and finishes. Also, as traffic patterns emerge it is simple to just feather in a light coat of finish and it will come right back to the desired beauty.

If the surface of the floor is smooth or slightly rough it can be finished easily. If the floor has a lot of permanent stains, or as could be the case in a dining room, the pores are filled with many years accumulation of grease, they are probably beyond care and should be covered with a material of some type.

When finishing a floor that has been used but not had any previous materials applied, or one that is a new surface, it should be cleaned well and rinsed well. A good cleaner would be a strong synthetic cleaner or floor stripper. The floor should be rinsed several times to insure it is clean.

The next step would be to "etch" the floor. Etching is a process of applying a solution of water and muriatic acid to the surface. The acid will break down the lime around the particles of sand that is in the cement. The removal of the lime will allow the sealer to penetrate the surface and secure itself to the sand. The finish will adhere to the sealer and the material on the floor will be well anchored. Etching is only done once to a cement floor.

After the etching solution is scrubbed on the floor, it must be removed completely. Flooding the surface is the best way to remove the acid. If this is not possible, several heavy rinses must be given to insure it is perfectly clean.

After the floor has completely dried, a solvent floor sealer is applied. Use a paint roller, lamb's wool applicator, or a tool of similar materials for this process. Solvent sealer is a type of penetrating paint, but much thinner, and will sink into the surface.

The next step could be controversial, but we haven't had good results without doing it. We apply a coat of water sealer over the solvent sealer. We haven't had good luck in getting the water base finishes to adhere to the solvent sealer, but they will hold to the water sealer.

We allow at least 24 hours before we put on the water sealer. At least an hour drying time should be given before the first coat of finish is applied.

It takes several coats of finish before the floor shows the desired sheen—anywhere from four to seven coats. We add one thin coat each week to maintain, and this gives us adequate curing time for the finishes as well as the sealers.

Selection of the finish is also very important. Finishes come in various grades known as the solid content. Some are not temperature controlled, and when the floor drops to below freezing it will not adhere and can be easily removed with detergent. Some finishes are not as slip resistant as others and become very slippery after several coats have been applied or when wet. The salesman of the supply house should know his products and be able to recommend the products that will take care of your needs. Buy only a small amount to try then you can better make your own decision.

WOOD FLOOR. The care of either hard or soft wood floors is very similar to that of the cement floor except in the very beginning of the floor preparation. Wood floors need the proper sanding and filling. A gymnasium finish or plain solvent sealer can be used. At this point I would recommend a small test area with the product chosen. After the water sealer has been applied, the metal locking floor finish can be the next application. Again this is applied using several thin coats.

Finishes cost about $6 to $8 per gallon. The initial cost to establish a good basic film may seem expensive, but the expense of continued maintenance will be less. If a wood floor has been painted it is very difficult to get the surface down to something acceptable and it would probably be more economical to put on some type of covering.

ASPHALT or VINYL ASBESTOS TILE. This type of floor covering probably already has many coats of various finishes including the old Carnuba wax. These floors must be stripped down to the tile. The secret here is to have no less than two people working. All during the stripping time the floor needs to remain wet. Stripping is a lesson in itself, and we will not go into details except to say only do a

small area at a time. It could take several days to strip a floor of any size with a minimum crew.

Once the old finish has been removed, it can be neutralized with an acetic acid solution. In many cases this will not be necessary if the floor has been rinsed well.

The next step is to have the bare floor buffed with a polishing pad, but more and more housekeepers are skipping this step because it is too much time spent for the results gained.

Many manufacturers of floor finishes claim it is not necessary to seal a floor before the application of the finish itself, but this really depends upon the material used. We use a water sealer, not a solvent sealer. (Solvent sealer will dissolve the floor tile and ruin the floor very quickly.)

When using chemicals, it is extremely important to have the proper training. Many chemicals used today will completely ruin whatever they come in contact with if not used properly. It should also be noted that many of the water sealers of today don't have ammonia keys, and so the strippers will not remove it from the floor. This means that as long as the floor is in good condition you will not have to strip it for a long time.

We use a non-ammoniated synthetic cleaner with cool to cold water, and a cold water rinse in our daily cleaning. Heat and ammonia will remove the surface you have spent time and money on to obtain the desired sheen. One or two rinses is very important.

As in the case of the cement and wood floors, the finish used on the tile floor should be a metal locking finish. Asphalt tile floors will require more coats to gain the desired luster than will the vinyl asbestos tiles.

SHEET VINYL or LINOLEUM. These floors are very similar to the tile floors in maintenance. They are less porous, and after cleaning will probably not need a sealer. With the first application the finish should have enough viscosity, particularly if it is a 22 to 25 percent solid material. The first coat should be applied fairly heavy allowing ample drying time before the second coat is applied.

In some instances the seams on these floor coverings will open up after a period of time. This must be cared for quickly before moisture penetrates and loosens the material from the sub-floor. If time and trained personnel are available these floors can be spray buffed out to a beautiful looking floor. It should be noted that in many finishes of today, the higher the sheen, the more slip resistant the floor becomes.

Scuff and black marks will not appear as quickly as on a floor that has not been buffed on a regular basis.

PERMANENT FINISH VINYL. This floor covering is not a practical material for commercial or camping use. Soil brought in by heavy traffic will wear off the permanent finish and the only thing to use is what is recommended by the manufacturer of the floor covering.

EQUIPMENT. What type of equipment should one have to maintain the floors in their camp? The major investment would be in a floor machine. They come in sizes from 12 to 24 inches in diameter. For the average camp the 24 inch machine is much too heavy to haul from cabin to cabin, or where it must be lifted from one level to another. The 12 inch is a small, light machine, and therefore, is not a good investment.

The 20 inch machine is a little cumbersome and heavy, but is probably the best size. The one drawback would be that it might be a little difficult for a woman to handle. There is a 17 inch machine that is just coming on the market and has a lot of possibilities.

A floor machine can be diversified in use thus helping justify the purchase. Carpet cleaning—whether it be rotary shampoo or cotton pad, floor scrubbing, and buffing would be the principle uses. Proper training in use of these machines makes them easy to operate.

A water vacuum is another machine that could be well worth the investment. Its use in floor stripping or heavy scrubbing is time saving. It is a handy tool when cabins are flooded for whatever reasons. It is very efficient in pulling water from a carpet.

MOP HEADS. Here is a seemingly insignificant item, but so important.

The string mop that has the ends sewn together is the best type. They can be washed out each day in the average home washing machine. This will insure a clean head each time it is used and the life will be lengthened.

The heads come in many sizes, from 8 to 24 ounce heads. The larger ones will be quite heavy when filled with water. The small ones are ideal for use by women. It would be your preference as to the size to purchase. They also have quick release handles that are easy and clean to use when changing mop heads. Your local supply house will assist you with more information.

Since the subject of floor care has not been gone into in detail, I would be glad to answer any questions anyone may have. Address questions to: Leonard Campbell, Forest Home, Inc., Forest Falls, CA 92339. Questions or hints of general interest will be published in a later issue of the *Journal*. □

Maintain "Free" Chlorine Residual, PH Balance in Pool Care

by William Treadwell

CAMPING MAGAZINE, JUNE 1978

by William Treadwell

Maintain "free" chlorine residual, pH balance in pool care

An ounce of prevention is worth a pound of cure. Even when converted to the metric system the principle is still valid. Time, energy and money spent to keep your camp swimming pool up to snuff is cheaper than the time, energy and money spent to correct problems.

A swimming pool's best friend is a good test kit—together with a person who will use it properly. A test kit that will measure the "free" chlorine residual and pH is a minimum necessity. It should be used to measure the "free" chlorine residual a few times each day, without fail. The pH test should be done at least once daily and more frequently if the pH changes a few tenths of a unit in a day.

It appears that the easiest test kit to use to measure the free chlorine residual is a DPD test kit that uses liquid test materials. Some kits are provided with little pills but they are more trouble to use. There's no sense in working too hard. The test kit should measure a range of about 0.5 ppm (parts per million) to about 2.0 ppm free chlorine residual.

Record Test Results

The test results should be recorded in a record book along with the time at which they were performed. The next step is for one to do what the tests indicate needs to be done.

If the "free" chlorine residual is too low, or if the pH is not within the proper range, steps should be taken immediately to get them where they should be. Later is too late; problems have already started to develop.

Why is the word "free" being emphasized throughout this article?

Maintaining the "free" chlorine residual within the proper range is one of the few keys to having a beautiful, trouble-free pool. Chlorine does two important jobs in a pool. It kills bacteria and algae and it burns up other contaminants. If there is no "free" chlorine residual in the pool, these jobs either will not be done, or will not be done rapidly enough, and problems will start.

Because bacteria and other contaminants are continually being introduced into the pool, it is necessary that a sufficient amount of chlorine be in the pool at all times to prevent problems. Therefore, chlorine must be added continually to the pool both to provide enough to do the jobs and to provide for a little excess. This excess is the "free" chlorine residual — free to react immediately with the wide variety of contaminants that get into the pool.

More, not Less, Needed

When chlorine reacts with contaminants containing ammonia, such as urine, chloramines are formed. These are the chemicals that are one of the causes of eye irritation—"red eyes." These are the chemicals that are the primary source of the "chlorine" smell given off at times. Most people attribute these problems to "too much chlorine" when in truth,

the problems are caused by "too little chlorine." The solution to "red eyes" and the "chlorine smell" is to turn up your chlorinator to feed more chlorine into the pool system or to superchlorinate the pool. More chlorine is needed to burn up the ammonia compounds as rapidly as possible.

The major source of ammonia that gets into a pool is urine. The problems associated with chloramines can be reduced if we can ever reduce the amount of urine entering the pool. We should all work together to reach this goal.

If there is a sufficient "free" chlorine residual in the pool at all times, problems will be kept to a minimum or corrected as rapidly as possible. Most people are afraid of chlorine and are afraid to have too much in a pool. A "free" chlorine residual of 2.0, 3.0 or 4.0 ppm will not harm either the swimmers or the pool. A "free" chlorine residual of less than 1.0 ppm is generally not enough. So, use your test kit frequently each day and adjust your chlorinator to maintain a "free" chlorine residual greater than 1.0 ppm.

Maintain the pH

Another key to having a beautiful, clear pool is maintaining the pH within the proper range, 7.2-7.6. This system is used to measure whether the water is acidic or basic. Because people understand the term "alkaline" better than "basic," we'll use "alkaline."

If the water is acid which is indicated by a pH number less than 7, it can dissolve metals and cause eye irritation. If the pH test results in a number greater than 7, the water is alkaline. Pool water should be slightly alkaline at all times, but water that is too alkaline can cause problems. The water may be cloudy, and chlorine will not be as effective.

To prevent problems caused by acid or alkaline water, the water must be kept within the proper pH range, 7.2-7.6. An acid water condition can be corrected by adding small amounts of sodium carbonate (soda ash), testing the pH about an hour later, and adding and testing until the pH is raised to the proper range. A water that is too alkaline can be corrected by adding small amounts of hydrochloric acid (muriatic acid), and testing and adding until the pH is adjusted to the proper range.

If you use gas chlorine at your pool, the pH of the water will become acidic and soda ash must be fed continually into the water or small amounts added regularly by hand. The water must be tested frequently enough so you can either adjust your soda ash feeder or manually add soda ash frequently enough to keep the water slightly alkaline, 7.2-7.6.

If you use liquid pool chlorine (sodium hypochlorite) at your pool, the pH will rise, become more alkaline. To prevent the water from getting too alkaline, it must be tested frequently enough so small amounts of muriatic acid can be added to keep the pH within the proper range, 7.2-7.6.

Watch Large Amounts

Never add a large amount of soda ash or muriatic acid to the pool at any one time. A lot of soda ash can cause cloudiness in the water which could take hours to clear. Too much muriatic acid added at one time may not get diluted rapidly enough and dissolve some of the metals in the circulation system. Then as the pH returns to its normal alkaline condition the metals will precipitate and stain the pool.

As stated earlier, tests for "free" chlorine residual and pH must be made frequently. If they indicate that something is not as it should be, corrective work must be done immediately and not postponed.

The major loss of chlorine from a swimming pool is attributed to the sun. This is pure loss—the chlorine dissipated by the sun has not benefited the pool one little bit. Chemists and people interested in preventing this loss of chlorine have discovered that cyanuric acid when added to pool water will reduce the effect of the sun resulting in a financial saving.

To use cyanuric acid properly you must have a test kit that will measure the concentration of this chemical in the water. It is generally recommended that the concentration of cyanuric acid be kept between 25 ppm and 100 ppm. Less than 25 ppm seems to be ineffective in saving chlorine while more than 100 ppm seems to reduce the effectiveness of the chlorine.

At the start of the season dose your pool with the number of pounds of cyanuric acid that will result in a concentration of 60-80 ppm. Every week or two test the water with your cyanuric acid test kit; when the concentration is below 40 ppm, add a few more pounds of cyanuric acid to raise the concentration to 60-80 ppm again.

Test More Frequently

If you have been sold a chemical compound that contains both chlorine and cyanuric acid to use as your source of chlorine, you must test for cyanuric acid frequently because the concentration will increase. When it reaches 100 ppm or higher, the only way to reduce it is to throw away a lot of pool water and add fresh water to dilute the remaining cyanuric acid. Since this procedure wastes water, chemicals and heat, changing your source of chlorine to one that does not incorporate cyanuric acid is suggested. The other sources are usually less expensive, so you have achieved a double saving.

Algae problems can be prevented by maintaining a high "free" chlorine residual throughout the pool, by maintaining the water at the proper pH, 7.2-7.6, and by keeping the pool free of dirt by brushing and vacuuming.

If algae grows in your pool, the cure requires more time, energy and money than prevention. Remember the first paragraph? Almost all algae problems can be

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Mr. Treadwell, a registered sanitarian with the Contra Costa County (CA) Health Department teaches an annual course on operation and maintenance of swimming pools. He is a member of the Swimming Pool Committee of the National Environmental Health Association.

corrected chemically — through use of a lot of chlorine and by keeping the pH within the range of 7.2-7.6. The process of using a lot of chlorine is called super-chlorination. If the algae are freely floating throughout the pool, add about one quart of liquid pool chlorine (sodium hypochlorite) to each 10,000 gallons of pool capacity, in the evening after the pool is closed.

Jelly-Like Spots

If the algae take the form of jelly-like spots on the bottom, turn off the recirculation pump and sprinkle a quantity of granular pool chlorine (calcium hypochlorite) on the water surface over the spots. Do this in the evening after the pool is closed and do not handle the chlorine granules with your bare hands. Brush the pool in the morning and if the algae is not all gone, repeat the procedure the next evening.

Thereafter, prevent future problems by maintaining the pool properly. Test the water frequently each day with your test kit. Keep the "free" chlorine residual above 1.0 ppm throughout the pool at all times. Keep the pH between 7.2-7.6. Brush the pool daily. Operate the recirculating system 24 hours each day so the water is always being filtered and is kept sparkling clear.

The time, energy and money spent in maintaining the pool properly will be less than the time, energy and money spent in correcting problems. □

Do-It-Yourself Docks

Lightweight, Durable Docks Are Easily Built

by Martin and Paul Silverman

CAMPING MAGAZINE, MARCH 1984

For years one of the weightiest problems at camps has been putting the waterfront together in the spring and taking it apart at season's end. Wooden docks are heavy and subject to rot and continual repair due to buffeting by the elements. Aluminum docks, while effective, are expensive to purchase and subject to factory repairs.

At Kippewa for Girls a system of floating docks was developed that has proven revolutionary in design because they are easily built (only seven tools are needed), require very little maintenance, are lightweight and easily carried, and most importantly—very durable.

The "Kippewa Floating Dock System" can be made from readily available aluminum and wood materials. The frame will require no upkeep. The deck, if made to specifications, will last eight to ten seasons with only cosmetic upkeep and is quickly and inexpensively replaced.

The system used at Kippewa for Girls is located on a 12-mile lake which can become quite rough. The docks are buffeted by the prevailing winds most of the time. However, they come out of the water like they go in—in perfect condition.

Martin and Paul Silverman direct Kippewa for Girls, a summer camp on Lake Cobbosseecontee in Winthrop, ME.

The concept for the Kippewa Floating Dock System is simple. A frame is built of 1-1/4 inch aluminum pipe or electrical conduit. The latter can be purchased in 10-foot sections, while aluminum pipe can be obtained in longer lengths. Speed-rail fittings are available for a number of applications, t's, ells, side ell t's, etc., and are used to join the corners and supports. An allen screw tightens the speed-rail fitting onto the pipe. The finished frame forms a crib to hold the styrofoam. The dock sections can be made 10 feet by 8 feet or 10 feet by 5 feet. The 10 feet by 8 feet section requires four 9-inch thick billets of foam, while the 10 feet by 5 feet section needs only two billets.

The deck frame is made of 2-inch by 4-inch spruce with a covering of spruce or pine board all carefully treated or may be prepared on-site with a readily available commercial product. Galvanized nails must be used in the construction of the deck. The wood is then stained with house stain to further preserve the wood and give the dock an attractive appearance. The wood is lightweight and fits over the aluminum frame like a box top. This eliminates the need to fasten the frame and deck together and greatly facilitates pre- and post-season handling.

Additional dock sections can be added using connecting brackets made of 1/4-inch steel. The brackets can be made in virtually any machine or welding shop. Lag bolts are used to fasten the bracket to the wooden top. A 1-inch thick machine bolt that is 2-1/2 inches long with a washer and nut is used to hold the connecting brackets together. To keep the nut from backing off, the bolt is drilled to allow a cotter pin to be inserted.

Ladders can be made by bending the aluminum pipe and using speed-rail, side ell-t's, and pipe to form the steps.

The cost of building these docks is about the same as building a wood dock. However, on these the aluminum frame will never need to be replaced. The lightweight, separate frame and deck design and significantly smaller bulk make undercover storage very feasible. Most importantly, a small crew of four people can put the dock system in the water and remove it at season's end in a very short time with little effort.

Construction of the Kippewa Floating Dock System requires only seven tools: tape measure, tubing cutter, drill, allen wrench, socket wrench, saw, and hammer.

For those with a preference for the feel and appearance of a wooden deck, the Kippewa Floating Dock System is an excellent alternative. Plans are available for those who want more detailed information.□

V. Energy

Effective Maintenance Equals Energy Savings

by John Murray

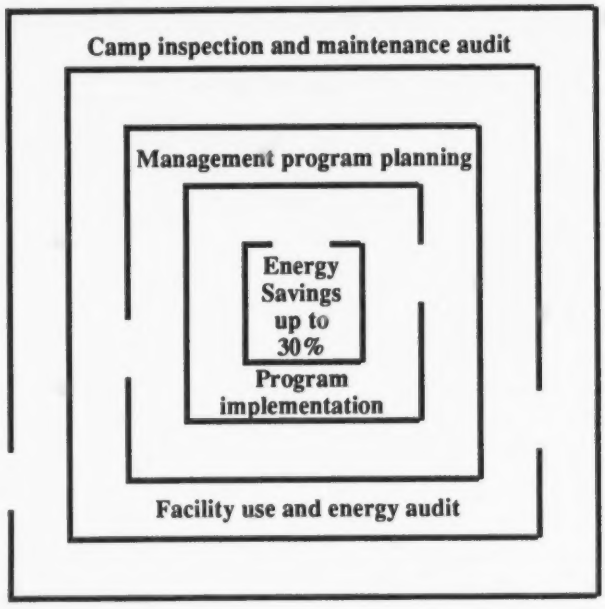
Camping Magazine, March 1981

Energy consumption and cost have become major concerns of Americans today, and promise to be crucial factors affecting our future life-style and national security.

As a result, new energy technology is developing more alternatives in energy sources, with greater advancements in solar, coal, natural gas, and nuclear power. Unfortunately, technology is having a difficult time keeping pace with consumption. Solutions through inventiveness do not always come easily. The incandescent light bulb, for example, was only being used in 50 percent of American households 25 years after its invention.

While technology advances, efficient maintenance remains the key to conserving energy and reducing costs. The National Assembly, an organization of nearly 40 voluntary health and social-welfare organizations, joined together with top agency executives to identify and act on energy conservation by developing an energy conservation and management program that can reduce consumption by as much as 30 percent.

"If you do not have a good maintenance program, you are never going to save any energy," states Jackie Cheney, Facilities and Services Director at the Hartford, Connecticut, YWCA. The National Assembly advocates a commitment to action through the formation of an energy-management team. The team may be comprised of those with technical expertise from within the volunteer structure along with representatives of utility companies and agency staff members. "Initially, it centered on me because I had to get it going and I had to get people interested," explains Ms. Cheney. "Once the building superintendent became intrigued with what we were attempting to do, then we entered into much more of a partnership relationship. I don't see how we can do it any other way. My skills are in management, his skills are in the technical area."


Camp inspection and maintenance audit
Management program planning
Energy Savings up to 30%
Program implementation
Facility use and energy audit

By conducting an energy audit, the team determines how the energy is being used, and what it costs. If the camp owner, for example, has already developed an effective maintenance system, gathering the necessary energy information is relatively simple. It should begin with a campsite inspection, analyzing those maintenance operations which must be performed and their energy implications. John Hopp, resident manager for the Meyer Program Center of the Lenni-Lenape Girl Scout Council in Paterson, New Jersey, explains, "We began by analyzing our gasoline consumption. By having regularly scheduled trips to town, once or twice a week, we are able to eliminate unnecessary travel. Those few things that were needed four or five times a week were costing us big dollars for gas. Using the right piece of equipment for the job helps, too. It doesn't take an eight-cylinder flatbed to drive into town. We're using our four-cylinder vehicles a lot more and even considering an electric cart or a two-cycle ATV (all-terrain vehicle) for routine site inspections." Delivery service to the site also helps reduce gasoline consumption by maintenance personnel. By ordering replacement parts from a distributor, Hopp has been able to have parts delivered to the site on a regular schedule, thus eliminating a retailer's markup and added trips to town.

After this preliminary audit is finished, a second audit should be conducted with the guidance of a site and facility planner, architect, or engineer with the expertise to really look at your facility. In addition to energy systems, facility usage will be looked at before recommendations are made. "We have to have an architect look at our main lodge. I know we're losing heat, I just don't know how much. I'd like to explore the feasibility of double-glazed windows and a woodburning furnace, as opposed to our present gas system," explains Hopp. Wood is a renewable resource. Hopp maintains that an on-site forest management plan, prepared for him free by the state forester, will

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John Murray is a property development specialist for Girl Scouts of the U.S.A., author of the book FACILITY MAINTENANCE SYSTEMS, and principal in the firm of John Murray and Partners.

provide him with the necessary fuel he needs. "The next thing we looked at was our heating system for the rest of the site," explains John Hopp. "Our program center at Lake Rickabear is open year-round, and most of our outbuildings are heated. What we have to do is consider a program and facilities plan that will allow us to concentrate our support facilities in one area. We just can't afford to heat buildings we don't need."

The energy-management team's review of all the data collected should address the following considerations:

- ☐ The percentage of the annual budget spent on energy
- ☐ Energy consumption patterns for the past five years
- ☐ Facility and equipment use patterns and their impact on energy consumption
- ☐ Projected energy costs based on current consumption
- ☐ Principal areas of energy waste

Revision of maintenance operations and repairs should be made along with development of low-, medium-, and high-cost strategies. Maintenance operations and repairs include such procedures as repairing windows, adjusting thermostats, scheduling vehicle use, reducing lighting levels and hot water temperatures, and cleaning filters, boilers, and light fixtures.

Low-cost strategies, which should pay for themselves in one year or less, include installation of weather stripping, air conditioner covers, and timers on lights and hot water heaters. Operations and maintenance and low-cost strategies can save between 25 and 30 percent in energy consumption.

Medium-cost strategies, which have a payback of two to four years, include such items as insulation, installation of double-glazed windows, and replacement of incandescent lights with florescent or sodium lamps.

High-cost strategies, which should pay for themselves in five or more years, include low-technology solar systems and heat-reclamation systems such as solar panels or shower houses to heat water. Medium- and high-cost strategies can save an additional 20-25 percent, but should be introduced only after operations and maintenance and low-cost measures are implemented.

Merely planning an energy management program does not save money; implementation does. Implementation should begin with those tasks that are most easily initiated and reveal the fastest cost reduction. Personnel and client awareness of the plan and their participation in it are crucial.

Ms. Cheney explains that, "We began by informing our staff and residents of our energy conservation program. We enlisted their support in turning off lights, closing shades, reporting leaks—that kind of thing. We're decreasing our wattage in our incandescent lights, removing excess florescent lights, and installing florescent watt misers. We've issued contracts to insure the proper maintenance of our heating, cooling, and ventilating equipment. This year we're scheduled to reduce the infiltration of our residence facility, and we're also exploring the installation of a computerized system."

It is important to monitor consumption in order to evaluate your management program and its goals and to consider the data gathered and its accuracy. Discussion by the management team should reveal the appropriateness of their actions upon realization of energy-consumption goals and their effect upon clients. New goals should be established and a detailed plan of action initiated.

"If you're concerned about rising energy costs and rising operating costs," says Jackie Cheney, "then you need to get involved with energy management. Somebody needs to take major responsibility for it, whether it's the executive or the building superintendent or another staff member. Any agency that owns a facility has to deal with the issue. And if you don't, it will simply eat up more and more dollars."

For more information on the National Assembly energy management program, contact: The National Assembly, 291 Broadway, New York, NY 10007.☐

Solar Energy

Directors Can Learn Basics to Develop Their Own Systems: Solar Proejcts Can Be Part of Your Camp Program

by William H. Mashburn

Camping Magazine, September/October 1979

The purpose of this article is to provide a basic understanding of the principles of solar energy systems, their uses and limitations, material selection, and good design practices. Because of the many options available to persons interested in solar applications, no attempt has been made to provide detailed information on either do-it-yourself projects or commercially available equipment. This selection process has to be an individual one based on knowledge, skill, application, and investment capital.

If we were to go outside the earth's atmosphere—which is a distance of approximately 50 miles—and measure the amount of energy that is available, we would find that 430 Btu's/sq. ft./hr. would fall upon a surface that is normal to the sun's rays. (The Btu is a unit of measurement of heat and one Btu is approximately equal to the amount of heat contained in a wooden match.) As this energy travels through the earth's atmosphere, some of it is lost to diffuse scattering, to reflection from clouds, and to absorption by moisture and gases in the earth's atmosphere, so when it finally reaches earth's surface, it has lost approximately 20 percent of the amount that is available in outer space. This amount, of course, varies with the depth of atmosphere that the rays must travel through, the amount of cloud cover, and the amount of contaminants in the air.

In addition, the amount of energy varies from season to season as the relationship of the angle of the sun to the earth changes. In winter, the sun moves to a low of 19 degrees below a horizontal line represented by the equator. This, then, causes the winter sun to come in at a low angle through the earth's atmosphere to reach the North American continent. By coming in at a low angle, the rays are made to travel through a longer distance in the earth's atmosphere. For this reason, even though the sun is closer in winter (91,325,000 miles), because of the greater penetration distance, the energy is much less than in summer. As the sun moves to a high of 23 degrees above the horizontal line represented by the equator, it reaches a more perpendicular angle with respect to the North American continent causing the rays to have less distance to travel through the earth's atmosphere.

Collecting Energy

If we wish to collect as much of the energy as possible, it would be desirable to keep our collector mounted normal or at right angles to the incoming solar rays. However, the angle of the sun is changing daily. Because solar systems are rigidly mounted, it is not practical to consider changing their mounting angle. Therefore, an optimum angle for year-round operation is desired and has been determined to be latitude plus 10 degrees. For example, in Virginia where the average latitude is 37 degrees, the optimum angle for year-round operation would be 47 degrees. The collectors should, of course, be facing south.

The technology of solar energy certainly is not new. Recorded history shows it going back several hundred years. It has been reported that as early

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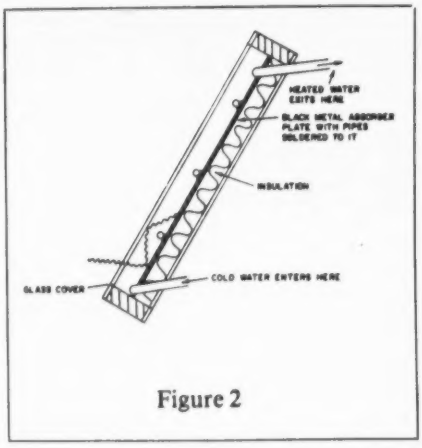

HEATED WATER EXITS HERE
BLACK METAL ABSORBER PLATE WITH PIPES SOLDERED TO IT
INSULATION
GLASS COVER
COLD WATER ENTERS HERE

Figure 2

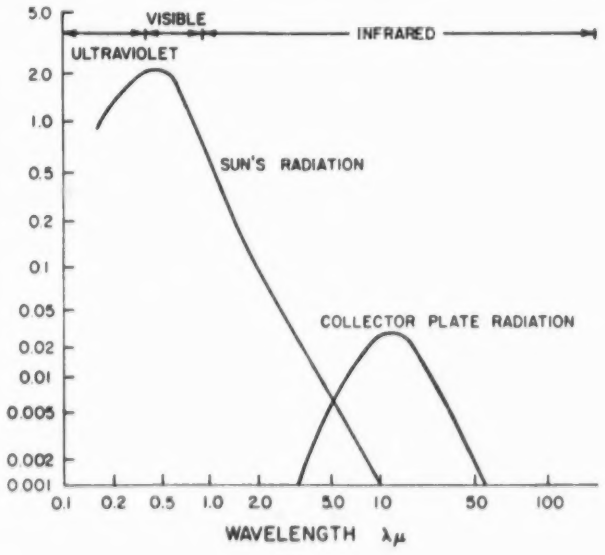
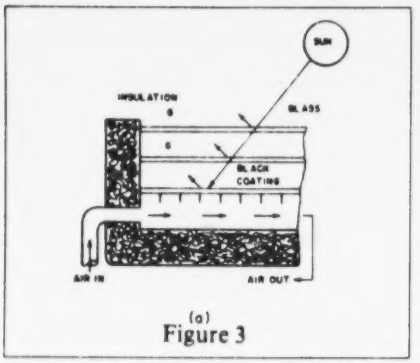


Figure 1

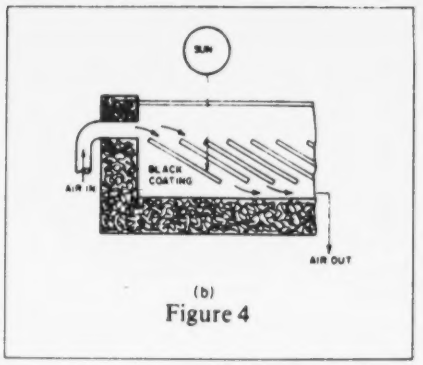
Mr. Mashburn is an associate professor in the Mechanical Engineering Department at Virginia Polytechnic Institute and State University.

as 1700, a concentrating solar collector was built that produced temperatures high enough to melt diamonds. However, if we are to develop useful systems that will have a life expectancy longer than that necessary to provide an economic payback, then the development of solar energy really becomes a materials problem. Materials react to solar energy in either one of three ways or a combination of these. The incoming radiation is either transmitted, absorbed, reflected, or a combination of these. We wish to make maximum utilization of these characteristics in the various components of a solar collector.

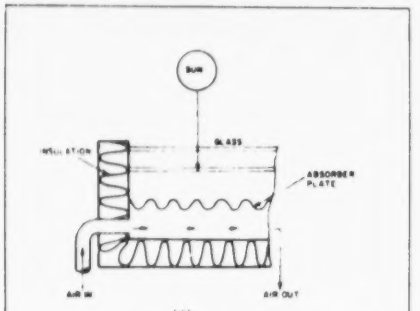
First, let's look at the characteristics of radiant energy that comes both from the sun and other warm bodies. The higher the temperature of a body, the higher is the frequency of the energy that radiates from it. The sun's temperature which is approximately 10,000 degrees R causes it to radiate in the frequency spectrum as shown in Figure 1. Notice that this spectrum is made up of ultraviolet visible and infrared rays ranging in wavelength from .1 to 10 angstroms. A body at a lower temperature, such as a solar collector plate, radiates at a longer wavelength as shown in this figure, and is exclusively in the infrared spectrum. It would be very desirable, then, to have a collector that would allow the sun's radiation to pass through and be absorbed into the collector plate and then to have the longer or infrared waves produced by the collector plate to be trapped or reflected back. This is known as the greenhouse effect and it occurs not only in a well-designed collector, but also in nature. For example, when the sun has been shining during the day and then is followed by a cloud cover at night, temperatures are warmer because the cloud overcast reflects the infrared energy back to earth.



(a)
Figure 3



(b)
Figure 4



(d)
Figure 5

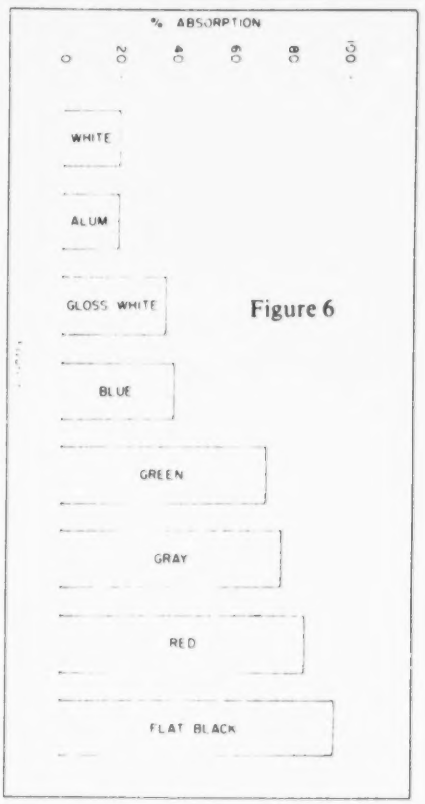


Figure 6

Selection of Materials

A material that is most effective in providing this function for a solar collector is glass. It has the characteristic of transmitting 90-95 percent of the sun's energy and then reflecting back lower infrared waves or infrared radiation that is produced at the absorber plate. Glass is the only material that has this characteristic. Plastics transmit the energy but do not reflect back the infrared waves and, therefore, do not act as a trap. Some glass materials are better than others. Low iron content glass transmits more of the solar energy and is identified by looking at the edge. If it is clear or blue, then it has low iron content. If it is green, the iron content is high. Glass manufacturers have already developed a high interest in the potential market for solar products and have developed glass materials that have a high transmission and, in addition, are much more shatterproof. While other materials such as fiberglass and film plastics do not have the same trapping effect as glass, they do have other advantages such as low cost, low thermal expansion, and are less susceptible to breakage by thrown objects or by natural phenomenon such as hailstorms. Because of the trade-offs then, glazing or commercially available solar collectors may consist of either glass, plastic, or fiberglass impregnated materials.

Absorber Plate Designs

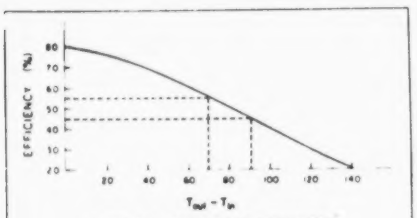
The next component of a solar collector is the absorber plate. This plate should be located from 1-1/2 to 2-1/2 inches below the glazing so that the glazing is not exposed to excessive temperatures. The absorber plate may be designed to heat either a liquid or air.

Liquid absorbers are made in a variety of designs. Many of them consist of tubing that is bonded to a flat metallic plate. This tubing can be either copper or aluminum. Copper is preferred since it is compatible with tap water and does not require special prohibitors. Copper also is more compatible with existing plumbing. The absorber plate may either be steel, copper, or aluminum. The bonding of the tubing to the plate is critical because a high resistance at this point will prevent a good transfer of heat from the plate to the tubing and cause an overall decrease in collector efficiency. Good bonds are made by brazing the tubing to the plate, press fitting it into matching grooves, or other similar techniques that provide good contact surfaces. Absorbent plates are also made by bonding two flat plates together with various techniques such that water flows in a controlled pattern between the plates. Figure 2 is a typical design of a liquid collector.

Air collectors come in a variety of configurations as shown in Figures 3, 4, and 5. All seem to work equally well. Air is of course the medium used to absorb and transport the absorbed energy, and the panel is designed to create a turbulent flow of air so as to

cause a scrubbing effect on the absorber plate, thus increasing the efficiency.

The amount of energy that the absorber plate will absorb is dependent directly upon the coating that is applied. Figure 6 shows the percent absorption for a variety of colors. Notice that flat black in this case is the highest, being in the 90 percent, followed by red and grey. We would also expect that green would have a fairly high absorption since leaves are green and have the prime function of absorbing solar energy. Most materials that absorb radiant energy also emit it at about the same rate. However, since we are absorbing it at a high frequency from the sun and emitting a lower frequency from the absorber plate, there are some materials that have a significant spread in the absorption and emission rate. These are called selective surfaces. Most of these are under development and are yet to prove their durability under long life conditions. Heat resistant flat black paint, which has a short wave absorption of .94-.98 and a long wave emission of .88 is still one of the most common coatings used.



EFFECT OF OPERATING TEMPERATURES ON COLLECTOR PERFORMANCE

Figure 7

Choosing Insulation

The next component to be considered is insulation. In building a boxed structure that is going to be exposed continuously to the outside extremes of weather from year to year, it is realistic to assume that leaks are going to occur. Therefore, the insulating material should be of a closed cell material that will not absorb moisture and therefore, decrease the insulating characteristics. Insulation should be along the side as well as behind the absorber plate, as this can be a significant area of energy loss.

Framing can be of aluminum, steel, or wood. If wood is used, it should never be in direct contact with the absorber plate which can get quite hot. Tests have shown that if wood is exposed to temperatures as low as 212 degrees F for a long period of time, it is possible for combustion to occur.

Collector Efficiency

Figure 7 is a curve of the temperature differential, that is, temperature out minus temperature in, of the fluid versus the efficiency of the collector. This curve is typical for a great number of collectors. Efficiency can be improved slightly by such things as double glazing, selective surfaces, excellent bonding, and other good design characteristics. This curve shows that at a temperature differential of 80 degrees, which is a typical operation, the efficiency of the collector would be 50 percent. Since this value varies constantly with the time of day and with the season, it is a rule of thumb number that can be used for a close approximation of amount of energy available.

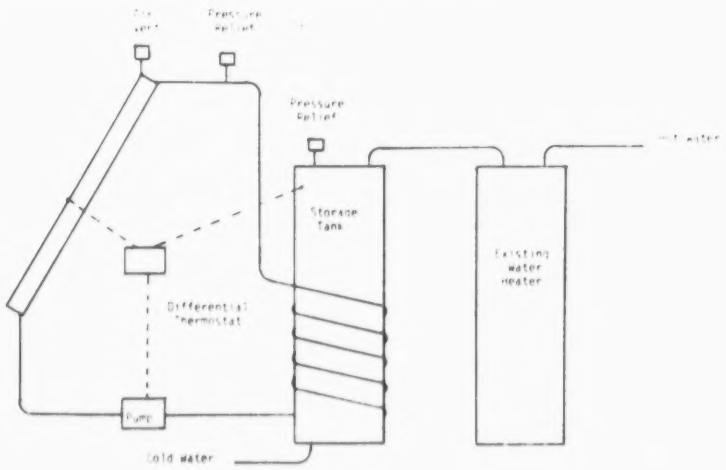


Figure 8

Water Heaters

Because they can be used for year-round operation, solar systems used to heat domestic water have the most economical benefit of any solar application. Such a system is basically simple once the technology is understood. A typical system with all of the necessary components is shown in Figure 8. A discussion of these components that are utilized to make the system both efficient and safe follows.

Because the pump is utilized just to circulate the water in the system, and is not required to pump against a significant head, it can be very small in size, even as low as 1/20th horsepower.

The differential thermostat controls the operation of the pump. There are two sensors associated with this unit, one located in the collector and the other in the storage tank. These sensors detect the temperature of these two units, and when the temperature of the collector exceeds that of the storage tank, the differential thermostat turns the pump on.

The air vent is located at the highest point in the system and is used to purge the air out of the fluid and, thereby, prevents vapor locks which would disrupt the flow of fluid through the collector system.

The pressure relief valve is a safety precaution that prevents build-up of excessive pressure if temperatures should become high enough to cause the fluid to boil.

The heat exchanger design depicted here has a double wall which is required in order to meet many building codes if antifreeze is used in the primary circuit.

The storage tank for the solar-heated water is in addition to the existing water heater. The cold water line, then, comes into this storage tank, so that when the solar system is operating efficiently, hot or tempered water from this tank is supplied to the existing water heater where little or no additional energy must be supplied to bring the water up to the proper temperature.

Freeze Protection

In a liquid system, freeze protection is a major consideration. Several of the techniques used for freeze protection follow.

Antifreeze—One of the most common methods of freeze prevention is to use a system such as shown in Figure 8 with a proper amount of antifreeze added to the liquid flowing through the collectors. The disadvantage of this system is the added cost of the antifreeze plus the

(continued on next ;

double heat exchanger that is required by building codes.

Drain Down—This system simply allows the water to drain back down out of the collectors once the pump stops running. The major disadvantage to this system is that a pump with a higher head capacity is required.

Dump Valves—Solenoid valves can be utilized in such a system so that when the temperature drops to near the freezing level they will automatically shut off the flow of water and drain the system. These valves are designed to automatically drain the system in case of power failure.

Pump Control—By adding a control module to the system that turns the pump on when temperatures are near freezing, warm water from the storage tank is then circulated back through the panels. This has the disadvantage of cooling previously heated water. However, experience indicates that except on the very coldest of nights, a minimum of energy is required to prevent freezing.

Air Panels—Another method of preventing freezing is to have an air collector blowing the heated air across an air to water heat exchanger with the system designed such that all plumbing is inside. With such a system, the excess heat from the air can be dumped into the living space in the wintertime so as to provide some additional space heating. While skilled craftsmanship is required to build a liquid collector, air collectors are rather simple and can be built with a minimum of skill and tools.

Space Heating

Just as there are many options from which one may choose in designing a solar water heating system, there are even more available in the design of a space heating system. Only by understanding the basic technology of solar systems can one make intelligent decisions on the type best suited either for new construction or an existing home. Again, as with domestic water heating, an auxiliary system is required as a backup to the solar space heating system. There are two basic systems utilized in space heating. One utilizes liquid and the other utilizes air.

Basic Liquid System

In a basic liquid system, the liquid is circulated by the pump up through the collector where energy is collected and

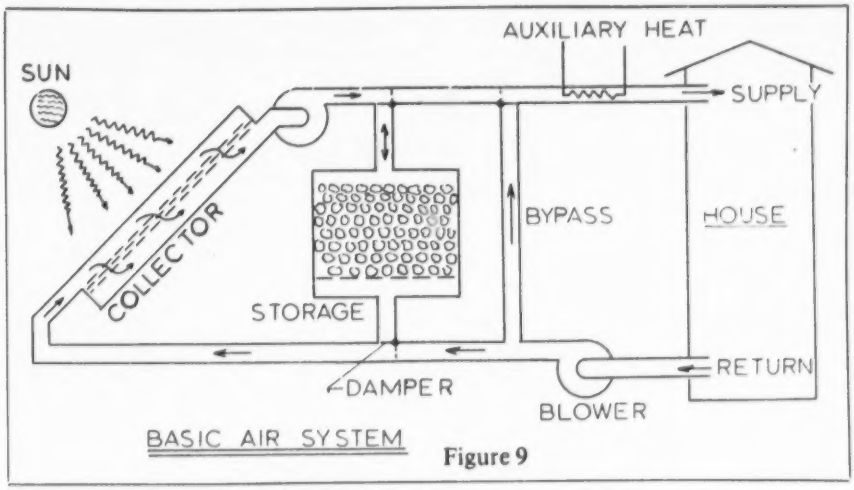


Figure 9

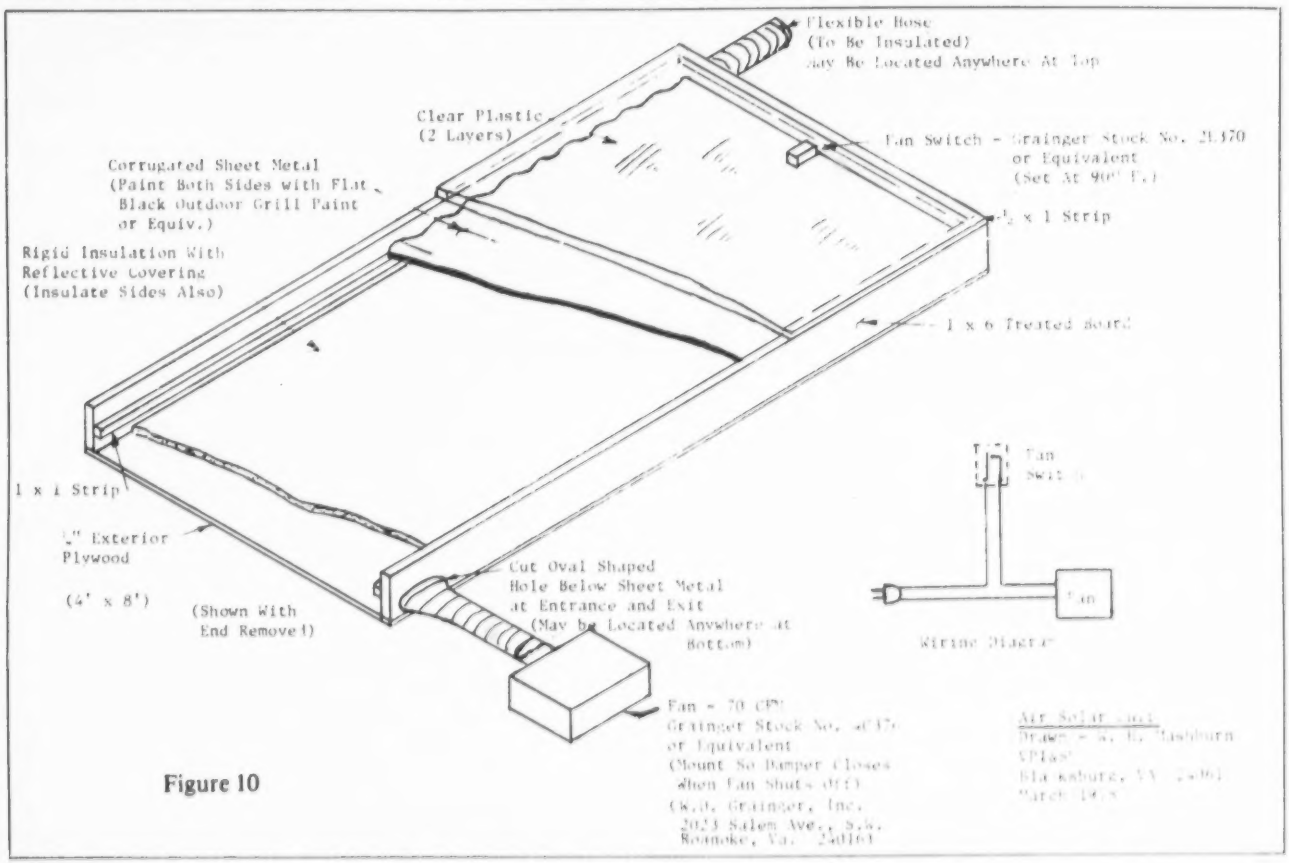


Figure 10

then transferred to water in a large storage tank. Energy is then supplied from this large tank of water to two sources. One goes to supplement the domestic hot water and the other is utilized in the space heating system. Any space heating system should have as a part of its operation, provision for also providing domestic hot water since this is utilized on a year-round basis and will improve the economics of the whole system. The energy from the stored water may at this point be utilized in the heating duct of an air system. The hot water may also be passed through baseboard connectors, radiant panels, or conventional radiators.

Basic Air System

A schematic for a basic air system is shown in Figure 9. Rock storage is the most commonly used method of storing the collected energy. Provision for heating domestic water can be included by having either a tank or heat exchanger coils in the storage bin. Air systems are free from the freezing problems associated with liquid systems, but controlling and moving air is more difficult than liquid.

Air solar units without storage can be very economical if the price is kept to a minimum. Heat is provided, of course, only when the sun is shining. Window units are available commercially or can be built with limited skill, tools, and materials. These units can operate from a single window or from two windows. Figure 10 shows the details of a unit that is designed to mount vertically on a south wall of a two-story house. The fan is located inside a first-floor window and the exhaust goes into an upstairs window. It can, of course, be utilized in other configurations such as between two windows on the same floor. A vertical mount causes approximately 15 percent energy collection during winter as compared to mounting at an angle of latitude plus 10 degrees, but mounting is easier and less conspicuous.

Application

By understanding the basics of solar energy as presented here, its utilization is limited only by the imagination—and the financial resources—of the camp administration. There are two reasons why camps should be involved in its use—first because of the potential economics, and second because of the excellent opportunity to provide a learning experience for our youth who will be the generation to face severe shortages of energy.

To trigger your imagination here are a few suggestions of solar projects.

1. Build an air system water heater
2. Build a trickle system whereby water trickles down a black metal surface covered with plastic or glass
3. Paint a water tank black and leave it in the sun for evening showers
4. Have solar projects as part of your youth activities. Have them build solar cookers, air panels, ovens, and so on. □

Soaking Up the Sun

Passive Solar Cabin Project Allows Off-Season Use of Site

by William Sharpe

CAMPING MAGAZINE, SEPTEMBER/OCTOBER 1982

It was one of those unique thematic days in camp program when staff members pray no impulsive friends from the city will decide to pop in and visit. Most of the staff were wandering around with towels draped over their heads. Some of the more enthusiastic actors wore dark sunglasses, striped housecoats, and clutched the battered remnants of oil and gasoline tins. Campers scurried by them, intent in their search for any rock that was "approximately the size of their heads." Each cabin group was laboriously engaged in building their particular version of a rock pyramid.

Eventually the camp staff, representing some of the lesser-known delegates from O.P.E.C., would judge a winner, and the cabin that had constructed the largest rock pyramid would be awarded a typical North American prize—a case of Coca-Cola.

Three weeks later the pyramids were gone, and in their place stood a well-insulated stone foundation, the future resting place of one of the first solar heated structures to be constructed in a North American resident camp.

Camp Wa-sa-ah-bun, a Canadian YMCA residential camp located 100 miles north of Toronto, Ontario, on the shores of Georgian Bay, has now completed testing of the solar-heated "Outland Cabin." The experimental cabin has enabled the camp to move into an expanded use of the 165-acre site by providing Wa-sa-ah-bun with its first building specifically intended for winter use. The cabin houses the controls for a new winterized water system and provides a sheltered storage area for most of the camp's firewood. With its indoor washroom, comfortable staff accommodation, and social space for campers, it has become both the social and physical focal point of the camp's winter activities.

The planning for the cabin began in the fall of 1977. Three former camp staff, involved in architecture and environmental studies, believed that a resident camp provided an ideal setting for the fashioning of a model of an energy-conserving community. They set about to use Camp Wa-sa-ah-bun as an example site which would demonstrate the possibilities that existed for reduced dependence on conventional sources of energy.

A number of concepts were introduced into the ongoing operation of the camp—large scale composting, a market garden, a managed fuel woodlot, and complimentary program activities were all part of the plan. However, the major component of the project was the design and construction of the Outland Cabin. Construction of the cabin began in August 1978. Now several years later, everyone associated with the effort seems pleased with the final results.

One of the primary objectives of the designer, Ross Hanham, was to design a low cost, energy efficient, prototypical structure for the organized camping and recreational field. With this goal in mind, he identified the following desirable features:

1. Simplicity of form and construction which would encourage a situation where the "owner" could become the "builder."
2. Active involvement of the user in controlling the thermal performance of the building, which would act as a valuable educational tool.
3. A low-cost design which would increase the affordability of the structure.
4. The incorporation of energy conserving features that would lower the annual operating costs of the building.
5. Maximization of solar heat gain to the building by simple and inexpensive methods.

As with any energy efficient building, physical siting of the structure was extremely important. The solar aspect of the cabin necessitated an unshaded, south-facing exposure which would allow glass to be used for solar heat gain. A sheltered site, situated away from heat-robbing, prevailing winter winds, was also an important consideration.

The cabin was designed to provide working, washing, and community space for four full-time staff. It was felt that individuals working year-round at the site would obviously need some degree of privacy. Accordingly, the plans provided private accommodation for a minimum of three adults.

All of these considerations eventually resulted in the design of a simple, attractive, two-story structure. Wall thickness was expanded to six inches in order to obtain an insulation value of R-22 in the walls and R-28 in the ceilings. The cabin possesses a steeply sloped, north-facing roof which deflects any prevailing winter winds that make their way past a number of natural windbreaks. This north-facing side of the cabin also has no windows in order to reduce heat loss.

The second story of the solar home extends only halfway into the cabin's interior. This design characteristic forms an open well in the living room that extends from the first story floor to the roof of the cabin. This open space allows a maximum amount of sunlight to penetrate into the cabin's interior. Each of the cabin's three bedrooms has a "window" which opens onto this interior well. Two of the bedrooms, located on the second floor, use sleeping lofts to maximize the cabin's usable floor space. The Outland Cabin has approximately 800 square feet of floor space.

The building utilizes a passive solar system to partially meet its heating needs. Such a system eliminates the need for roof-mounted solar collectors and an extensive mechanical system. A passive solar application simply involves the positioning of a large area of solar windows on the southern facade of a building. Solar radiation passes through the glass during the day and strikes large masses of high specific heat materials (a stone wall and rock floor) inside the cabin, thus

William Sharpe is affiliated with the Developmental Services of St. Catherines YMCA in Port Severn, Ontario, Canada.

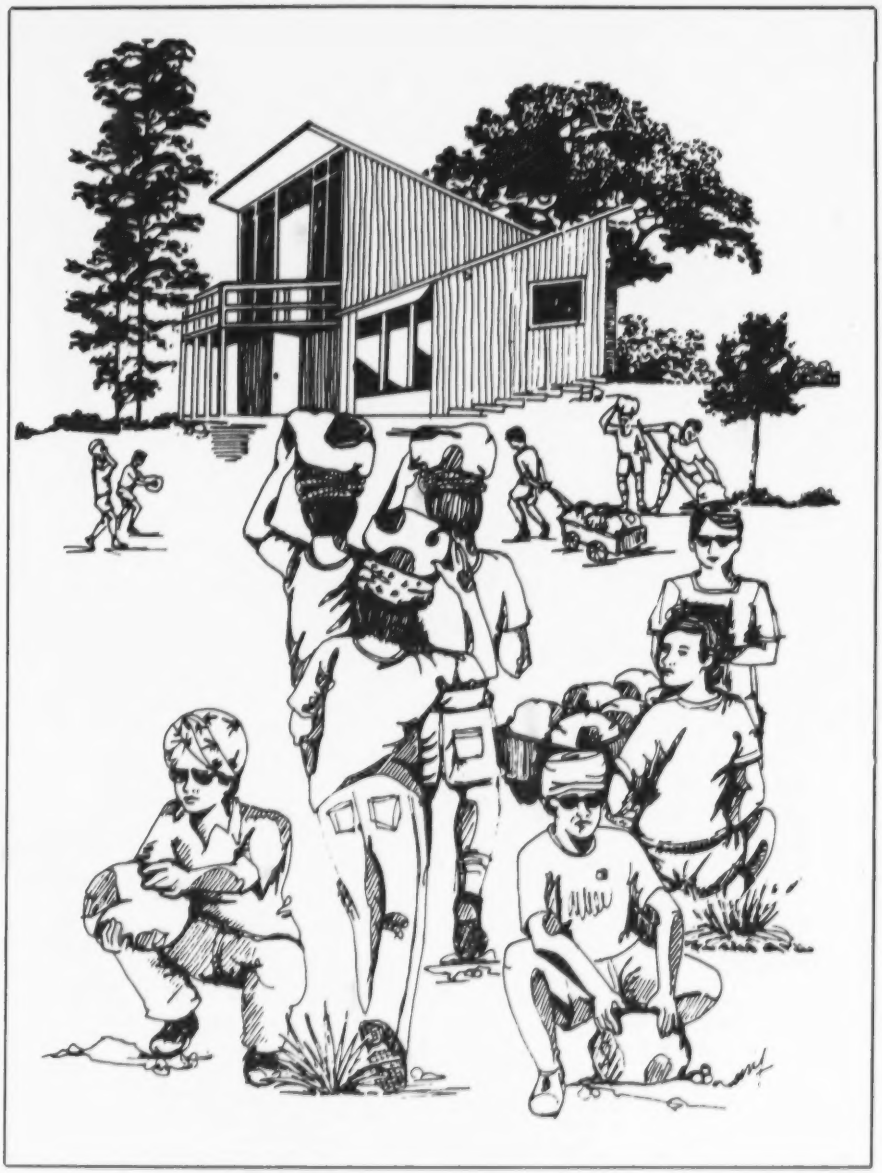
warming them. At night, insulated blinds are closed over the windows to reduce heat loss and the heat from the sun is emitted from the rock to the building's interior. By this simple system, in which the building acts as both collector and storage medium, solar radiation makes a significant economic contribution to the heat demand of the building.

It is estimated that during the coldest month of the year, January, the passive solar heat system provides approximately 50 percent of the cabin's heating needs. This means that under the worst conditions, the heating costs for a year's operation of the Outland Cabin will be one-half that of a similar-sized conventional structure. In Camp Wa-sa-ah-bun, heating costs are not a major factor, because a wood stove provides the necessary auxiliary heat for the cabin.

These 50 percent savings have been achieved with a capital cost deficit of $1,000 for the extra glass and a heavy duty fan. A life cycle costing analysis demonstrated that this added investment for a passive solar heating system will pay for itself within six years. Since the life expectancy of such a building is at least 20 years, and probably longer, a passive solar system becomes an attractive investment, even without considering the additional educational and environmental advantages.

The cabin's waste disposal system has been designed to substantially reduce water consumption. An electric composting toilet, which uses no water at all, was donated to the project. The toilet has saved 7,000 gallons of water annually, and such a unit offers a practical solution to those with limited access to water supplies.

The contemporary wood and glass structure may at first seem out of place in such a rural setting. However, the cabin has attracted a considerable amount of media attention in Canada, and has become a focal point of camp operations. Campers helped at various stages in the construction, and the overall simplicity of the building's design and heating system make it an excellent and realistic educational tool. Certainly the principles used in the design of the cabin—the exclusive use of renewable resources for heating, the reduced environmental impact on the immediate area, and the greater degree of self sufficiency—are all principles in harmony with the environmental ethic espoused by most resident camp operators.



The relatively low initial capital cost and reduced annual operating costs will also be attractive economic considerations for anyone contemplating the construction of a winterized building on their site. The design characteristics of the Outland Cabin are perhaps more marketable than the prototype itself. Most solar buildings used in a camp setting will require a considerable amount of fine tuning in order to meet the specific needs and physical constraints of a particular operation.

If today's headlines are any guide, then our preoccupation with energy, and its conservation, is only beginning, and buildings such as the Outland Cabin appear to be as comfortable and viable a starting point as any.□

Solar Heat

The Sun's Rays May Hold the Key to Organized Camping's Energy Demands

by Art Harrison

CAMPING MAGAZINE, SEPTEMBER/OCTOBER 1978

The solar age was born of an unquestionable and awesome force 4.6 billion years ago. Its life-giving process has been taken for granted and accepted passively by human beings since the beginning of time.

The sun is the center of our universe. Everything in infinite space revolves around it and is dependent upon it. The sun is the lamp and power plant of the earth. Life without it would be impossible.

Energy of the sun radiated upon the atmosphere of our planet is responsible for the climate and the weather and the changes in the weather; it gives rise to the winds and the storms on land and sea. It raises millions and billions of tons of water from the ocean, vaporizes and demineralizes it; collects the vapors into clouds, moves the clouds thousands of miles over land and sea by the energy of the wind, which is also produced by the energy of the sun. It condenses the vapors and then scatters them again on the dry land to make life possible. The energy of the sun activates the germ of life hidden in the seed and causes it to grow, to produce the plant and to reproduce itself. The green leaf, with its mysterious chlorophyll, would not be possible without the energy of the sun. There could be no forests on the mountainsides or green meadows for cattle and sheep, and there would be no flowers or fruit to delight the heart of man without the energy of the sun. Even the coal, deep in the earth, which has been warming our homes and providing energy to turn the wheels of our great industries, is but the stored up energy of the sun in fossilized remains of precious worlds of plant life.

Assuming all this to be true, it would seem that camp life would be nonexistent if the sun were not available to us in the form we have experienced it, a passive, dependable resource that can be counted on to provide us with warmth and pleasure most of the time and a life sustaining force constantly.

Today, a relatively new problem faces camps. Energy costs are taking their toll of even the best camp management systems. The sun may offer the answer.

The amount of energy that this planet receives in the form of sunlight every day exceeds our wildest projections for total energy consumption—230,000,000,000,000 units of horsepower. About 30 percent of the direct energy reaching the earth is reflected back into space. Another 47 percent is absorbed by the atmosphere, the land, and the oceans where it is converted to heat. Most of this heat is radiated out to space as well. About 23 percent of incoming solar energy drives the earth's water cycle of evaporation and precipitation before it, too, is reradiated into space. It takes less than 1 percent of our incoming solar energy to power all the wind and waves atmospheric and oceanic circulation. This eventually converts to heat, too, through friction, and is also radiated to space. Plants capture 3/10,000ths of the incoming solar radiation chemically through photosynthesis.

If there were no other energy sources, solar energy could and would provide 100 percent of our energy needs.

Since the beginning of recorded time, man has yearned to harness the energy of the inexhaustible and free sun. Legend has it that Archimedes incinerated a whole Roman fleet by reflecting the power of the sun. In recent years interest has intensified as our normal energy sources have become more scarce and expensive. Space exploration created great leaps forward in learning about the processes of converting sunlight directly into electricity and other thermal engine techniques.

American society today, however, has been shaped by the availability of low cost energy. Our life-style reflects our easy access to fuel, as much as that of our grandfathers' life-style which reflected the availability of land. Now we face an inescapable fact: the only way we can maintain the life-style that cheap fuels have given us is to find ways to supplement our dwindling fossil fuel resources.

Sunlight as a form of energy generates about 1400 Btu's per square foot every day. If we can convert all the energy to heat, that is enough energy on one square foot to heat a gallon of water from near 32 degrees to 212 degrees, or the boiling point. Using solar energy just to heat and cool camp buildings and to heat water could save 25 percent of our present fuel consumption.

Solar energy is clean, safe, not subject to inflation (at least the raw material) and non-depleteable. It's the one source we cannot run out of, and certainly to campers and camping, is a familiar resource we already know a lot about and how much it does to enhance the total experience.

While we have had the know-how to harness the sun's energy for many years, the economic incentives to do so have not been strong until the recent increase in the cost of supplying energy from fossil fuels.

Where do we go from here? First of all, caution is important. Almost every day the mail brings a new perspective on solar energy and its usefulness. Brochure after brochure proclaim the advantages and the methods for achieving the heavenly condition of becoming totally independent of traditional energy systems. With similar frequency, someone raises the question in the context of a camp planning conversation about the practicality of the use of the sun as an alternative energy system in camps as an option for reducing operational costs.

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The purpose of this writing is not to explore the technical or construction processes of introducing solar energy systems to camps. Rather the intent here is to look at its broad applications for camps and some basic guidelines for making practical choices in the matter of its use or non-use.

Supplemental heating and cooling of buildings, heating of hot water, and supplying supplemental amounts of electricity are the primary areas of usefulness to camps.

Camps for the most part have a more practical field of usefulness for solar energy than does the typical home owner or commercial building operation. When one goes to camp, it isn't anticipated that a comfort level equal to that supplied in the urban setting will be available. The lack of air conditioning, minimum quantities of hot water, and buildings that are not always at 72 degrees, are not serious deterrents to the camper unless he does not have some saving moments of refreshing cool breezes, hot bath water, and adequate warmth. So where the city dweller or merchant has a more constant requirement for a level of year-round comfort, the camp situation can be more lax and somewhat flexible in its limits; and, therefore, is more compatible with the sometime elusive benefits of solar energy.

It is probably not practical at this time to consider solar energy as a 100 percent heating or cooling source. The percentage of heating and cooling available from the sunlight source will vary according to the part of the country where the camp is located and the type of equipment used. In every case a conventional system will be required to back up the solar system if economic and space requirements are important to the process of deciding or utilizing a solar energy system. Most systems can be expected to provide only 50 to 75 percent of a camp's space heating needs.

Only in the area of hot water heating can camps come close to a 100 percent system, and again this is somewhat dependent on location and equipment.

Several reasons are apparent for installing a solar energy system: (1) long-term savings; (2) energy conservation; and (3) a system that is ecologically safe and clean.

Depending on location, about 55 percent of the energy needed to run a camp will be used for space heating and about 15 percent for hot water; the remaining 30 percent will be used in electrical output and miscellaneous energy dissipation.

There are two types of solar energy systems: an active system and a passive system. The active system is divided into a liquid and air system that uses pumps, pipes, fans, or ducts to transfer the stored heat to the use area. The passive system depends entirely on convection or moving air which is not generated by mechanical means to transfer the heat from the storage area to the use area.

An active system can be used equally well in new or existing construction; a passive system is best utilized in new construction where the unit is designed mainly for space heating.

The basic elements of a solar heating and hot water system involve a collector, storage, distribution, transport, controls, and alternative energy. Simplified, the process involves capturing the sun's radiation energy, converting it into heat energy and storing this heat in an insulated energy storage tank and delivering the stored energy as needed to either a hot water or a space heating system. Heat energy is distributed as hot air or hot water by convection or by circulation in ducts or pipes to radiators of various kinds.

Hanover Campers Build Solar Heater

by John E. Ensign

CAMPING MAGAZINE, SEPTEMBER/OCTOBER 1978

"Necessity is the mother of invention." Or so it seemed, as a group of high school campers in a wilderness outpost camp at Camp Hanover discussed some way to get hot water in place of those oh-so-cold showers.

Fortunately for them their counselor was a recent graduate of an engineering school, interested in alternate low cost energy and eager to apply some of his knowledge in an actual demonstration. Add to this a camp director ready to commit the funds for materials and a willingness to take a chance on youthful enthusiasm with little practical experience. The equation for a successful do-it-yourself solar hot water heating project was completed with the plans purchased ahead of time and with the practical help of the resident maintenance supervisor to assure good workmanship.

John Ledgerton, Georgia Tech graduate, George Gaines, the maintenance supervisor, and 12 high school boys and girls spent most of their spare time between canoe and backpacking trips constructing the copper flat plate solar collectors, erecting them on the site, and connecting them to the 220-gallon pressure storage tank. The ribbon cutting celebration on the last full day of camp, with some 200 other campers and staff looking on and sharing in giving the counselor and maintenance supervisor a hot shower, made all the sweat and effort worthwhile. Now, some four years later, those campers bring their boy or girl friends or parents to show them "their solar water heater."

The construction of the solar hot water heater was a learning experience with long-range practical payoffs, not only for the dozen senior high campers and counselor, but for the camp which has continued to receive alternative low cost energy.

John E. Ensign is director of Camp Hanover in Mechanicsville, VA. He is also a past president of the Virginia Section.

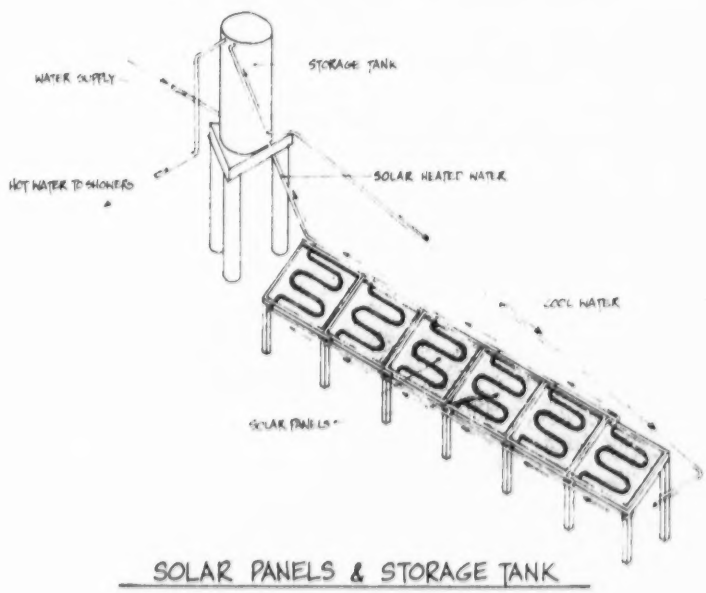
Parents and friends back home make visits to Camp Hanover, near Richmond, VA, to see and feel the hot water that flows all day long without any fuel other than the sun.

The original, built in 1975, has inspired a second do-it-yourself unit in another remote area of camp without electricity or other fuel source. A third was under construction this past summer. Long-range plans include construction of similar units for the other three bath-houses as well as the central kitchen, which currently uses bottled gas for heating hot water. At the same time a year-round solar heated swimming pool, covered by a prefabricated aluminum ribbed greenhouse type structure and heated by 924 sq. ft. of homemade solar collectors, was scheduled to be completed for use in the fall of 1978.

The payoff is far greater than the dollars and cents savings (which are considerable!) in not having to purchase fuel for heating hot water. Enrichment of the camp program from the ecological standpoint has been tremendous as campers and counselors have learned how to conserve the precious hot water. There is only enough storage in the 220-gallon insulated tank for part of an extra day after rain stops the sun's heat, so campers have to limit their use of hot water so others may have a shower, too.

The pride of ownership felt by those who have helped construct one of these units over the four summers cannot be measured, but was an important program ingredient in their growth. Their pride in craftsmanship in soldering the copper joints, in braising them to the copper backing, and in constructing the wooden support structure has contributed significantly to the feeling of self-worth and identity of the work campers, counselors, and those who shared the experience with them.

In dollars and cents, the initial project cost about $900 for the 96 square feet of homemade copper flat plate collectors, copper pipe and fittings, the 220-gallon pressure tank with its eight inches of insulation



SOLAR PANELS & STORAGE TANK

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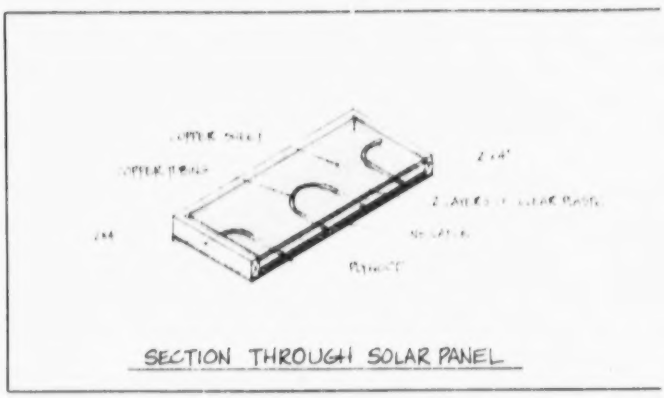
covered with a plywood cabinet, pressure relief valve, and the salt treated lumber for the collector frames and structure. While this was about three times as expensive initially as a gas heater of comparable capacity, there has been no fuel cost or other expenses since.

This fuel savings has now more than repaid the larger investment so that future savings will all be a bonus for the camp's budget.

Camps considering undertaking a similar do-it-yourself project will need to have a builder-maintenance person who is familiar with soldering copper plumbing pipes and who has the patience to supervise campers and counselors who have more enthusiasm than skill. Such supervision is mandatory if leakproof joints and good workmanship are to result; if the camp's investment is to be worthwhile; and if the campers are to have pride in a job well done.

Someone will also have to be able to read simple plans well enough to see to it that the technical requirements are met. (For this reason, I would recommend the little booklet, *Solar Water Heating for the Handyman*, available for $4.00 from Edmund Scientific Co., Barrington, NJ 08007, No. 9484 by Steven Paige.) This is the simplest set of plans to follow of the many published.

Following their suggestions for a simple thermosyphon system (natural circulation that occurs when the sun heats the water in the panels, causing the heated water to rise to the top of the tank, with the colder water at the bottom of the tank returning to the bottom of the panels to be heated) avoids the need for circulation pumps, differential thermostats, and other complicated and expensive controls.



The drawings by John Ledgerton, Georgia Tech graduate, show the design of a solar hot water system that was built while he was a counselor at Camp Hanover.

This also means there is no further expense for electricity for circulating motors and no repair bills or electrician's fees. Also, such a system can be erected in a remote part of camp as long as water is available.

Other sources of information for do-it-yourselfers are plans from the Copper Development Association, 405 Lexington Ave., New York, NY, and Garden Way Publishing, Dept. 80072, Charlotte, VT 05445, for their *Build Your Own Solar Water Heater*, Catalog No. 105, for $4.95.

On the practical side, be sure to install a drain at the lowest point in the system so as to completely drain it at the end of the summer, before freezing weather. A year-round solar heater, with the necessary heat exchanger and antifreeze is a more complicated and expensive system than most summer camps will want to consider.

A money saving tip: look at secondhand or salvage yards for a good used galvanized storage tank—a new 220-gallon tank costs over $400, whereas a used one may be picked up for $50 and serve just as well for shower water.

Another money saving tip: use Kalwall (a reinforced fiberglass) for the glazing rather than glass and save about half on the initial cost and on replacement as it is very resistant to the rocks campers are prone to throw at glass. Finally, risk a little for a new method of water heating and help cut the fuel shortage, as well as giving your older campers a challenging and worthwhile project. □

Energy
Alternatives and Savings

by Robert L. and Sonia Vogl

CAMPING MAGAZINE, JANUARY 1983

Solar energy and conservation can give camp operators a dependable source of supplemental energy and reaffirm their commitment to environmental values. Camps that operate through the winter are especially aware of the need for energy conservation and efficiency. Summer camp operators, however, will be looking down the road for improved appliances that use less energy. Currently, solar heating of domestic water and swimming pools are immediate possibilities to be considered.

Although energy consumption has leveled off, both the high cost and uncertainty of Middle East oil supplies suggest that we continue to cut consumption. While we are cutting our consumption, there is still room for improvement. Our two best energy options until the year 2000 remain those of importing more oil or increasing our use of solar energy and conservation. Current oil surpluses may provide temporary relief, but the political instability of the Middle East remains a major point of our energy vulnerability.

Energy conservation is still an important source of savings. Even if you have cut your energy consumption, a brief review of some major areas of savings can help you rethink your commitment to energy conservation. Of course the first steps to take are those that are the easiest and least expensive. If a free or low-cost energy audit is available from either a unit of government or your local utility, it can assist you in sorting out your energy conservation priorities.

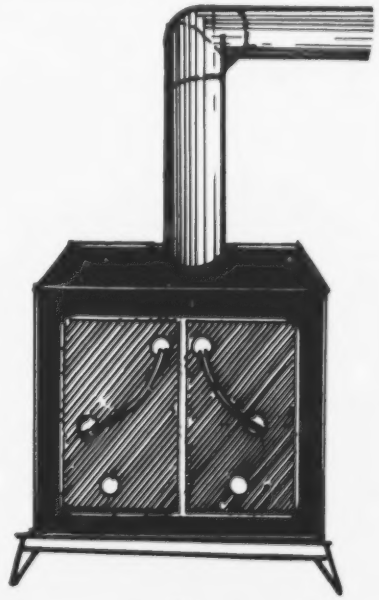
Heating buildings

Heating camp buildings deserves close scrutiny. Every furnace should match the size of the building being heated. Until recently, most boilers and furnaces were oversized for the buildings they were installed in. New units should be properly sized. Ask your heating contractor for literature describing the efficiency levels of new units.

Test the efficiency of your current unit by checking the temperature of the gases leaving your furnace and entering your chimney. In general, the temperature of the gases should run between 300 degrees F and 450 degrees F. If the temperature is above 450 degrees F, you are wasting heat.

This heat loss can be reduced in a number of ways. One way is to tighten the pulley on the fan motor so that one-fourth inch to one-half inch play exists midway between the pulleys. A ten percent reduction in the nozzle size or installing the smallest nozzle recommended for your unit is a second way to cut heat loss if you have an oil burning unit. Removing soot from the inside of a heating unit also cuts heat loss. Exhaust stacks can be modified to capture waste heat. Heat reclaimers with either fans or radiator-like fins can be attached to exhaust pipes. Automatic flue dampers which close to block heat loss through the chimney when the furnace is not working also save heat. Such modifications should only be installed by licensed heating contractors for safe installation.

Oil units should be cleaned and serviced both before the heating season and halfway through it to operate efficiently and save energy. Gas units require annual service and should operate at nearly 80 percent efficiency.



Filters used in a forced air heating system should be checked monthly and either cleaned or replaced.

How warm you heat your camp buildings has a major impact on energy consumption. Maintain a low overall building temperature, and heat only the rooms being used. Utilize efficient scheduling. At night and when a building is not being used, cut the heat level down to 55 degrees F, or lower if comfort and freezing water lines are not problems. On new construction, zone heating can be installed giving the flexibility of heating only the rooms being used in a building.

In a camp situation, serious consideration should be given to cheap alternative fuels such as wood, coal, corncobs, etc. Stoves could be used in many living spaces.

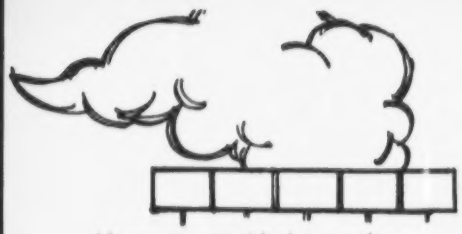
Insulation

Insulation is very important, with ceiling insulation being most important, followed by wall and floor insulation. In new camp construction, consider superinsulation. It involves no special techniques and can be done by anyone. But the tighter a building is, the more toxic fumes will accumulate. Superinsulated buildings need air exchangers. Insulation with a vapor barrier is easily installed in new buildings. Recommended amounts, expressed in R values, are readily available from a building materials store.

Insulating existing buildings is more difficult but not impossible, and the savings can run as high as 50 percent. Attic insulation tends to be easiest to install while wall insulation involves either drilling holes or temporarily removing part of the outside wall covering.

Preventing building moisture from lodging in wall or ceiling insulation is important so that the insulating quality of the material is not lost and the building is not damaged. If ceiling joists and wall studs are exposed in an existing building, it is easy to put in a layer of polyethylene as a vapor barrier. However, if that is not possible, oil based or aluminum based paints can be used on the wall or ceiling to prevent moisture from lodging in the insulation.

Robert L. and Sonia Vogl are both professors of outdoor teacher education at Northern Illinois University.



If you are considering putting new siding on a camp building, you should first consider adding an additional layer of insulation. Some people have chosen to add a layer of insulation to the inside of a building. If the interior walls are badly cracked and you intend to replace them, consider adding additional insulation with a vapor barrier to the walls. In some cases people have added a layer of insulation with a vapor barrier over an existing inside wall covering, and subsequently covered this layer with a finished wall. This approach changes the depth of the window and door openings and requires increasing the amount of trim to cover the space left.

The degree to which you insulate and seal air leaks in your building is determined by the following factors. First is the cost of fuel and the price of insulation. Calculating how long it will take for a given expenditure on insulation to save a comparable cost of energy reveals whether the energy savings are economically justified. A second factor involves the quality of air left in a building. Odors, moisture, fumes, or gases are generated in buildings and can become concentrated enough to cause discomfort or nausea. While a precise figure is not available, a heating and cooling contractor can provide you with information regarding the needed air exchange.

Window heat loss

Heat loss through glass is substantial. Even a double-glazed window can lose six times the heat of a comparably sized insulated section of the wall. Adding storm windows and doors will cut heat loss. If you are in an extremely cold climate, consider triple-glazed windows on the north side. If your windows are not an important source of solar heat or room light, they can be covered with insulating polyurethane or polystyrene rigid sheets. For convenience these sheets can be framed in wood and hung like an inside shutter. Thin, clear plastic sheets can also be used as interior storm windows. An alternative to plastic is to use drapes made of insulating materials. Leaks around doors and windows can be eliminated inside the building with weatherstripping while cracks or leaks on the outside walls can be eliminated with caulking. The payback time for eliminating heat loss through windows is about 20 years. In new construction, window space can be limited, especially on the north side, with little additional expense.

Water and hot water conservation

Another important area of energy savings involves the use of water. Conservation of water and hot water can be solved in many ways. Primary ways of conserving water are using water-saving fixtures and self-closing faucets. Showers are available which restrict flow down to 2.75 gallons per minute (gpm) and lower.

Cutting hot water use is a priority. Turning off water heaters when buildings are not in use is the most important. A good water heater has the capability to reheat 75 percent of the water capacity of the tank in one hour. It should be possible to leave the water heater off until an hour before the hot water is needed. If you do not wish to time things that closely, turning off the water heater during large blocks of time, such as overnight, or when the building is not in use for a day, can save energy. Automatic timing devices can also be used to turn on and off water heaters.

Small water heaters installed at the point of use are also available. These heaters only heat water when it is being used and are able to supply hot water instantly and continuously.

Units exist which hold both domestic and heating water. The domestic water is held in an insulated tank with a flash heater which provides a cheap source of heat and hot water. Insulated holding tanks should be used in high demand areas. Other ways to cut hot water use include fixing leaking faucets and lowering the temperature of the water in a heater to 140 degrees F.

Appliances

In general, only small energy savings are possible in using appliances. Replacing gaskets on stoves, refrigerators, and freezers are possible aids in reducing energy use. Closing an appliance door and placing a piece of paper between the opening and the gasket offers a quick test of the effectiveness of the gasket. When the paper is pulled there should be some resistance. If the paper comes out without any resistance, then the gasket should be replaced.

The biggest energy savings are possible when buying a new appliance. Most appliances now have energy efficiency ratings attached to them to allow the buyer to compare the amount and cost of energy used by different appliances. While energy savings may appear small when compared to the additional cost of an appliance, any future energy price rise will provide even greater savings.

Lighting

Lighting levels can be reduced by as much as 50 percent without causing eyestrain. Fluorescent bulbs are five times as efficient as incandescent bulbs. They are useful in bathrooms, kitchens, and recreation areas. Lower watt bulbs in halls, basements, and sleeping areas also save energy. For close work, lamps or specially installed fixtures can provide additional light when it is needed.

Solar

Active solar additions can be a real aid to energy conservation, but they can also create problems. Consult with a competent contractor before building additions.

Elements of passive (without mechanical aids) solar energy are increasingly being incorporated into buildings for heating. Large south-facing, double-glazed windows with few or no windows on the north, east, and west sides of a building are increasingly used. Double and triple-glazed windows, along with insulating window curtains or interior shutters, are also gaining in popularity. Small and simple greenhouse additions to existing buildings are becoming more common in the effort to save energy.

Once major passive solar applications and conservation efforts are underway to cut your energy bills, you can explore the exciting frontier of solar energy photovoltaics. In it, solar cells convert sunlight into electricity. An increasing use of solar energy is in the area of heating water. Such units can cut energy use 50 to 70 percent. While photovoltaic electricity is still a highly priced investment with a long-term paycheck, it may become a viable alternative in the near future.

No one form of solar energy dominates the field at this time. Quality control, maintenance, and service have caused problems for some solar users, but most of these problems can be avoided by patiently seeking the advice of a variety of local solar energy users. While exploring the solar options takes time, it is also fun, interesting, and potentially profitable. It is also an investment in the future not unlike the investment camps now make in the future well-being of youth. Not only will solar investments extend the supply of energy into the future, but they will also serve as popular examples of how we can use energy wisely.

It is obvious that many ways exist to save energy. Since building codes and health and safety standards vary according to areas of the country, it is necessary to check your intended modifications with local authorities to make sure that they are acceptable. While the suggestions in this article are widely practiced, it is just part of good planning to check local standards before going ahead with the modifications.□

Buying Emergency Power

Dean Ruediger

JOURNAL OF CHRISTIAN CAMPING, JULY/AUGUST 1979

When electric power fails at a camp, inconveniences and even dangers to health and life increase rapidly.

Some people believe power outages will become more common in the future as weather and fuel shortages pound on the electric grids. Remember, for instance, the power interruptions of up to a week and more in several large cities this past winter.

A week without power at a camp could destroy your refrigerated food supplies, halt the flow of your potable water if you use your own well, interrupt heating or cooling of your buildings and without a doubt close you down.

You can prevent at least the worst of these problems with an emergency power generating system. And with a system large enough you can put a stop to all such woes.

An emergency generating system consists basically of a generator, an engine to drive the generator and associated electrical components.

You select generators according to the number of watts you expect to use. For generators the size you need to power a camp you express the watts needed in kilowatts (KW—one kilowatt equals 1000 watts).

Emergency generators can power only those parts of the camp you think vital or they can supply electricity to the entire camp. It all depends on your needs and desires.

SKIMP AND CUT

When selecting standby generators, squelch any temptation to skimp and cut corners on the assumption you will never use the system. Equipment too small for the job proves little better than none at all. Usually when you need emergency power you need it desperately, so avoid short cuts.

Determine the size of your generating system by making a careful study of your current power consumption as well as your projected needs in the future. Perhaps you want to protect only your food supplies and keep your water well operating. Or you might want to add enough power to operate the lights in strategic locations, such as your infirmary, a building with a telephone and sufficient lighting to see your way around your grounds at night.

It makes financial sense to size your generating installation using a long-range view. One way to do this involves providing full power for your camp at the present. This gives you two advantages from the start.

First, if you install additional "vital" electrical equipment, such as refrigerators or a second water well, your system will be able to handle the increased load simply by dropping off other less essential equipment, appliances or lights.

Second, though a smaller generator for "selected" protection will cost less, special considerations in wiring a "selected" system offset the savings. For instance, you have to electrically isolate the buildings not receiving power to avoid accidential overloading of the system and to prevent a possible electrical shock to a maintenance worker who is unaware of the electricity going to a particular building during a power failure.

YOUR ALTITUDE

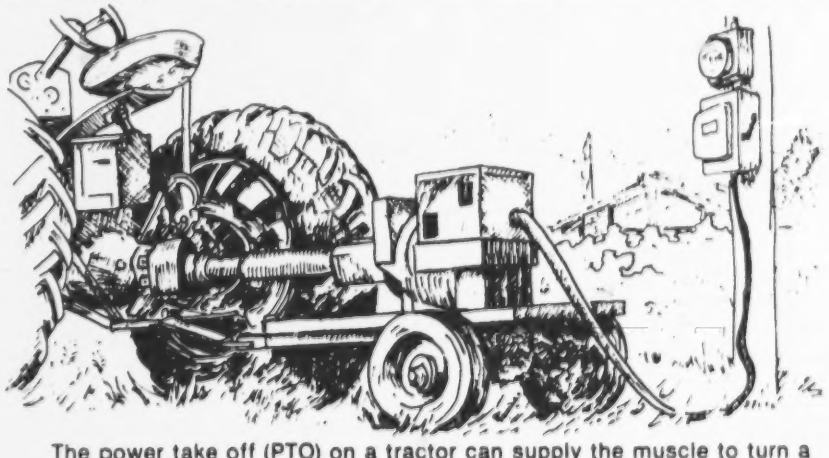
In making your selection you should also consider your altitude above sea level. If the manufacturer rates his generators' capacities at the altitude of his factory, you can derate four percent for every 1000 feet your camp is higher than his factory.

Other more technical electrical considerations in your selection—such as surge current of electric motors, magnetizing currents of transformers, heating effects and electro magnetic interference—need thorough exploration with the help of a competent electrician or system installer.

Engines running on natural or LP gases operate more efficiently than the others. These gases mix more readily with air and burn more completely in the combustion chambers. Other advantages include quick start-up after long shut downs because the gas remains fresh in storage and longer engine life because the gas contains no deposit-forming additives.

Gasoline engines give you a lower initial cost than either gas or diesel engines. They too start easily and can operate in very low ambient temperatures.

Low operating costs highlight the advantages of the diesel engines. Diesel fuel costs less than gasoline or gas.



The power take off (PTO) on a tractor can supply the muscle to turn a generator. The unit sits on a trailer and attached to the PTO through a "tumbling rod" to accomodate any misalignment. As a general rule, you can generate one kilowatt of electricity for every two horsepower at the PTO. Smaller tractors with PTO speeds of 540 rpm can power units up to 30 KW. Larger tractors with 1000 rpm at the PTO can drive units up to 80 KW. This Onan system is completely portable to the area of need.

Heavy construction and the lack of points, plugs and a condenser mean lower maintenance costs. Also, diesel fuel is extremely stable with its high flash point and low volatility making it safe to store above ground.

In addition to these considerations, you should look at the availability of various fuels in your location and research the government regulations concerning storage of these fuels.

COOLING ENGINES

You can choose either air or liquid cooling systems for your engine. The determining factor usually centers on the size of the generating unit. Systems up to 15 KW (15,000 watts) usually can operate efficiently on air-cooled engines. Larger units usually require liquid cooling.

In many situations you can use heat exchangers to use waste heat to warm nearby buildings.

LOAD TRANSFER

Electric utilities require you to use transfer switches on any emergency power generating units. This is because if the utility company's fails, the company does not want your electricity going out on their lines while workmen are making repairs. Such electricity could kill a workman.

Other features to consider when selecting emergency power generating systems include:

- vibration control
- heaters for diesles unites to allow quick start up in cold weather
- safety alarms to warn of low oil pressure, overheating or failure to start,
- muffling to meet your noise level standards as well as those of the government
- radio "shielding" to prevent interference with radio reception.

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VI. Sample Forms

Equipment and Supply Inventory

Equipment and Supply Inventory

Suggested Equipment and Supply Needs

Quantity	Item Description	Possible Source	Approximate Cost

Department, Cabin, or Area _____ Date Completed _____ Year _____

Person Completing Inventory _____ Position _____

Quantity	Description: Color, Serial #, Etc.	Condition: Good, Fair, Poor	Stored/Located

A list of suggested needs could appear on the back side of the above equipment and inventory supply record.

Maintenance Inspection Building Checklist

Maintenance Inspection Building Checklist

CAMP NAME _____ Date _____

Persons making inspections: _____

Check as O.K. or indicate assigned job card number.

NAME OF BUILDING OR STRUCTURE ⇨																			
Foundation																			
Sills																			
Floors																			
Outside walls																			
Inside walls																			
Doors																			
Windows																			
Screens																			
Roof																			
Steps																			
Chimney																			
Fireplace																			
Wiring																			
Plumbing																			
Fire protection																			
Building																			
Gutters																			
Drainage around bldg.																			
Housekeeping																			

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General Maintenance Inspection Checklist

General Maintenance Inspection Checklist

CAMP NAME _____ Date _____

Check as O.K. or indicate assigned job card number.

1. Utilities		2. Roads and Parking		4. Maintenance		6. Land Management		7. Program Areas	
Water System		Surface		Trucks		*Lakes and Ponds*		*Waterfront*	
Well casing		Ditches		Tractor		Silt control		Piers	
Well cover		Drainage		Tractor equip.		Aquatic weeds		Floats	
Spring protection		Bridges		Trailers		Dam		Boat dock	
Intake screen		Culverts		Power tools		Spillway		Guard tower	
Pump(s)		Service roads		Hand tools		Control gate		Beach	
Pump motor(s)		Gates		Spare parts				Control fence	
Chlorinator		Barriers		Standby equip.		*Conservation*		Check board	
Filter				Fire equipment		Erosion control		Boats	
Control system				Fire extinguishers		Wildlife mgt.		Oars	
Pipe lines				Camp signs		Stream mgt.		Canoes	
Storage tank		Inspected by:		Volatile liquids		Forest mgt.		Paddles	
Valves		Date:		Storage		Landscaping		Sailboats	
Winter drains				Basic records		Foot trails		Life saving equip.	
		3. Food Handling		Utility maps		Soil conservation		Life preservers	
Sanitation		Tote baskets		Mechanical equip. records		Obnoxious plants			
Sewer lines		Arrangement						*Field sports*	
Septic tanks		Stoves		Vehicle records		Conservatn. equip.		Archery range	
Seepage pits		Refrigeration		Inspected by:				Action archery	
Disposal field		Freezer		Date:		*Public Areas*		Rifle range	
Garbage disposal		Mixer				Picnic area		.22 range	
Grease trap		Ovens		5. Swimming Pool		Boundary fence		Rifles and guns	
		Dishwasher		Fence		Lawns		Fishing gear	
Electrical		Sterilization		Walks					
Power lines		Sinks		Pool walls				*Scoutcraft*	
line clearance		Tables/counters		Pool floor				Rope	
Telephone		Dishes		Gutters				Axes	
Telephone lines		Dish storage		Drainage				Bow saws	
Line supports		Utensils		Dressing rooms				Compasses	
		Storage space		Showers				Cooking equipment	
Gas and Oil		Ventilation		Toilets				Craft supplies	
Gas lines		Lighting		Filters				Outpost equipment	
Storage tanks		Garbage		Chlorine equip.				Shovels	
Regulating equ				Cleaning equip.					
Inspected by:		Inspected by:		Inspected by:		Inspected by:		Inspected by:	
Date:		Date:		Date:		Date:		Date:	

Comparative Shopping Form

Comparative Shopping Form

Equipment	Manufacturer	Model	Features	Cost
Mower				
Walk-in Refrigerator				
Mattresses				
Fogging Machine				
Pool Filter System				

Work Order Request/Log

Work Order Request Log

Request #	Date	Building	Comments	Date Completed

WORK ORDER REQUEST

To: _____ Request #: _____

From: _____ Date: _____

Place: _____

Problem: _____

_____

Reported by: _____ Date Reported: _____

Date Work Order Request Received: _____

Job Assigned to: _____ Date Work Order Completed _____

Comments: _____

_____

_____

(Return to director upon completion of job.)

Emergency Telephone Checklist

Emergency Telephone Checklist

	Number	Name, if Applicable
Police		
Fire		
Ambulance		
Doctor		
Hospital		
Food Supplier		
Dairy		
Meat		
Can Goods		
Fresh Produce		
Bakery		
Paper Supplies		
Pest Control		
Electrician		
Plumber		
Swimming Pool Repair		
Refrigeration Repair		
Garage/Tow Service		
Insurance Agent		
Lawyer		
Telephone Company		
Water Company		
Electric Company		

Mechanical Equipment Record

Type Equipment _____ Location _____

Manufacturer _____

Model # _____ Serial # _____

Design Data—Capacity _____

Horsepower _____ Volts _____ Amps _____ Other _____

Purchased From _____ Date _____

Installed by _____ Original Cost _____

For Parts and Services Contact _____

Gurantee Good Until _____ Estimate Useful Life _____

Other Data _____

Maintenance Schedule

1. _____
2. _____
3. _____

Driver's Daily Report

Camp Allen, Inc.

Date _____

Complete and turn in after each trip.

Vehicle _____ **Mileage** _____

Gas _____ **Gals.** **Oil** _____ **Qts.** **Other** _____

CHECKLIST

___ Fire Extinguisher	___ Water	___ Windshield Wipers
___ Reflectors or Flares	___ Battery	___ Horn
___ First Aid Kit	___ Lights	___ Hand Brake
___ Wheel Shocks	___ Brakes	___ Exhaust System
___ Oil	___ Tires	___ Steering

Remarks—Unsatisfactory items _____

Incident Report—On-road Failure, etc. _____

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